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The antecedents of Loyalty in the E-commerce B2C and the implications of logistics

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The antecedents of Loyalty in the E-commerce B2C and the implications of logistics

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1. Introduction

Since the last decade, the digitalization is expanding in all aspects of people's lives and the consumption market is no exception. According to the Comeos (2019) e-commerce study, the online purchasing is now reaching a total of 70% of the Belgian population with an average relentless increase of 3.13% a year. Belgians are now buying more and more often. We see in Comeos study's trends an increase of 71% of the people buying goods online on a monthly base and an increase of 36% of people purchasing more than 150€ a month compared to five years ago. Nowadays, more than 70% of the current Belgian population is purchasing at least once a year on the web platform. Companies have to follow this trend in order not to lose competitiveness and gain market share in a now well-established sales channel. Hence, a good method to seek competitive advantage would be to federate customers around once products and company. It is with this in mind that this study will focus on the customer's loyalty in the e-commerce.

Indeed, looking at the globalization of the market and the increase of competition, the capacity of a company to retain and attract customers has become one of the biggest factors of its success and longevity (Dick and Basu 1994). This statement tends to be more accurate in the web environment since the competitor is only a click away. It is in this context that the concept of customer's loyalty becomes essential, both economically and competitively (Semeijn et al. 2005). In fact, one common definition of it has been issued by Kincaid (2003, page 10). He defines customer's loyalty as " a consumer behavior, built on positive experience and value, which leads to buying products, even when that may not appear to be the most rational decision".

This purchase behavior is considered to be one massive advantage regarding the brand image, but also to the financial health of the company as in terms of spending. One loyal consumer may worth up to ten times more than a one-time consumer and thus he will be more prone to spend more in a company he is loyal to (Anderson and Srinivasan 2003). Moreover, the ability to retain customers is five times cheaper than acquired new ones (Slater and Narver 2000). Hence, the good understanding of the customer's loyalty could lead the company to increase its revenue, decrease its cost and enhance its brand image. Furthermore, as Webb (2010) mentioned, loyal customers through recommendation or by being the lead of a social trend may attract new customers.

Among the main operational factors discussed by many scholars in an effort to explain customer retention rate, logistics was highlighted as being part of the loyalty formula. Indeed, Esper et al. (2003) and Kull et al. (2007) showed that the failure of many web companies emanate from their inability to provide a sufficient logistic answer when it comes to reach their online promises. Thus, leading to a customer dissatisfaction. Certainly, the number of dissatisfied online customers due to lack of service, loss of orders or bad complain management have proven to cost several billions of annual lost sales for the web market (Rust 2001). Experiencing service breakdowns, lost orders, or inadequate complaint handling is notable and unsatisfying (Zehir and Narcıkara 2016). Therefore, this component will gather our attention in this study.

Likewise, one of the main driver of the online retailing for the Belgian, with a rate of 35%, is the effortlessness of this action. Indeed, purchasing online does not require any physical effort, as the product is deliver at the requested customer's place (Comeos 2019). It is precisely with this in mind that logistics and the delivery management is essential to achieve a good customer experience, leading to loyalty. The ability of the retailer to deliver their product accurately and without any issues to the customer will define their logistics

performance. In the e-commerce context, the performance is characterized as the ability to comply with a large amount of small orders (Ramanathan 2010). However, the ability to deliver the product on time and in good shape to the buyer is not the only part of the logistics aspect. According to several studies, logistics also includes the reliability of the transport information, responsiveness, communication, order-handling and distribution (Jay et al. 2008).

Asides from loyalty, logistics is also mentioned to be one of the key drivers for satisfaction. Several studies have already showed that logistics risks as late deliveries and inaccuracy of the orders, are sources of dissatisfaction (Esper et al. 2003; Kull et al. 2007; Rabinovich and Knemeyer 2006). Furthermore, according to many scholars this component known as satisfaction is considered as one of the key determinant of the customer's loyalty (Chandrashekaran et al. 2007; Flint et al. 2011; Lam et al. 2004). Satisfaction is a result of the quality or the ability of the retailer to comply with the customer expectation by reducing or fulfill the gap between those expectations and the product/service delivered (Kumar 2008). It is thus safe to assume that keeping customers satisfied by providing them a good experience is a way to ensure the stability of the sales either by the loyal consumers purchases or by spreading its good reputation through the loyalty rate in order to pull new customers.

We have chosen here the e-commerce segment as this segment is from a couple of years in continuous expansion around the world and Europe. Belgium is no exception and even if the e-commerce market share is currently lower than in its neighbor countries, it makes no doubt that being part of this movement will be a key of the future development of Belgian businesses. This subject also echoes the current events regarding the alignment of a lot of e-commerce retailer's leaders with the "Last miles strategy". Those companies aim to get closer to their customers in order to improve the efficiency of their logistics and transport solution but also to penetrate some foreign markets. We could take here the example of the web giant Alibaba building its distribution hub in Liege airport aiming to develop their activities around central Europe by reducing the lead time of their deliveries and bond with their buyers. Due to the specificities of the e-commerce, logistics has as well endorse an increasing role either when it comes to satisfaction, quality or success of the e-company (Esper et al. 2003). Complains either in B2B and B2C, which come from the unfulfillments of the expectations or contract terms regarding logistics last mile, are increasing with the requirement standards of the consumers in terms of logistics efficiency. E-retailers have thus to provide not only a good service or quality product but an overall experience around the purchase in order to float in a highly competitive market. Moreover, good logistics management is one of the main keys to abroad expansion. Companies could expand their market and reach new prospects just by extending their delivery zone, providing new potential source of growth. Furthermore, the competition tends to intensified, the world being relatively smaller and the customer closer to the supplier with the new transport modes. Keeping the delivery promises and being accurate are now more than ever source of satisfaction as a selling strong point factor (Kaynak and Hartley 2008).

With this study, we wish to extend the knowledge of the implication between the logistics efficiency and the loyalty to the B2C e-commerce sector. This research aims to better understand the implication of logistics accuracy on customer retention in order to provide additional insight of a good recipe of the e-commerce loyalty and how logistics affects it. To achieve that goal, we will first go through the existing literature of the topic and explain a couple of concepts and how their bond lead to loyalty. Secondly, this paper will introduce the hypothesis and the model used to support them. It will submit how the data have been

collected and the methodology used to make them trustworthy and usable. Thirdly, we will present and discuss the results of the regressions. Finally, this reading will reach the conclusion and limits.

2. Literature

2.1. A journey from expectation to loyalty

2.1.1. About loyalty

Brand loyalty is consider by the literature as a deep commitment to buy the preferred brand repeatedly and continuously. A loyal consumer would be more keen to purchase more frequently and for a higher amount. One of the more cited definition has been provided by Oliver (1999, page 34). He defines the concept of loyalty as "a deeply held commitment to rebuy or patronize a preferred product/service consistently in the future, thereby causing repetitive same-brand or same brand-set purchasing, despite situational influences and marketing efforts having the potential to cause switching behavior". This behavior highlights a significant degree of attachment (Podoshen and Andrzejewski 2012) to the brand, as a result of the crossing between behavior and attitudinal loyalty (Kuikka and Laukkanen 2012). According to Chaudhuri and Holbrook (2001), and Odin and Valette-Florence (2001), this trend to be more committed to a brand or to a retailer is the outcome of the value and favorable attitude the customer cast on the brand/retailer. The loyalty could therefore be considered as an emotional attachment (Dunn and Hoegg 2014).This feeling towards some brand or seller is shaped by the clustering of the positive experiences lived by the customer (Ramanathan 2010). Harris and Goode (2004), add more details to this definition, dividing loyalty into four concepts :

- The "cognitive loyalty" stands for the beliefs that the brand is more attractive than others;
- The "affective loyalty" refers to the positive felling perceived by the customer while using the purchased product or service;
- The "conative loyalty" represents the intention and the commitment;
- Those previous components lead to the final one, known as the "action loyalty", which is the conversion of these previous feeling into the action of purchase.

Flavián, Guinalíu, and Gurrea (2006) translate this loyalty concept into the online context. They define the consumer's loyalty as the devotion to buy a product or service from the same website. If we enlarge this definition to what was proposed by previous authors, we see indeed that the consumer intention and commitment are shaped by the positives experiences to buy from a website whom he is emotionally attached to and will not change to another web side despite the externals efforts to switch his behavior.

Gaining customer's loyalty is therefore the strategic goal of many current market stakeholders acknowledging that a loyal customer will buy more frequently for an averagely higher amount than a regular buyer. Their enthusiasm for the brand leads them also to be more responsive to the brand communication and to promote the brand to their acquaintance (Harris and Goode 2004). The study of Cyr et al. (2007) shows that any increase of the loyal customer rate triggers a significant raise of the profits. This ability of a company to attract and retain customer is the main component of a company's success, if not vital to its sustainability (Dick and Basu 1994).

2.1.2. Where does it come from?

Over the years, many scholars have studied the origin of the loyalty to its roots. Some of them have found loyalty to be linked to satisfaction (Flint et al. 2011; Russo et al. 2016), others go deeper and associate it to quality (Chen et al. 2009; Huang et al. 2012; Zehir and Narcıkara 2016), value (Janita and Miranda 2013; Zehir and Narcıkara 2016) or customer expectations (Flint et al. 2011). Those concepts not only have a direct significant effect on loyalty but are also interlink between each other (figure 1). The study of Janita & Miranda (2013), shows through their model's results, that there is a significant relation between all the four abovementioned constructs, excluding any relation between quality-satisfaction, and satisfaction-loyalty.

Zehir & Narcıkara (2016), in their study of the e-commerce, defend that there is a significant link between "Perceived Value" and "Loyalty Intentions" (1) but also between "E-Service Quality" and "Loyalty Intentions" (2), "E-Service Quality" and "Perceived Value" (3). Flint et al. (2011) outcomes conclude that customer value anticipation does positively affect both customer satisfaction (4) and loyalty. Claudine and Jay, (2003); Woodall, (2001), share that customer expectations are influenced by environmental factors and the way they are perceived by the customer (5). Meidutė-Kavaliauskienė et al. (2014) corroborate the intertwining between quality-satisfaction while Ajao et al.(2012) support the satisfaction-loyalty relation. Finally, we could assume through Kelley and Turley (2001) that the level of expectation has a reverse effect on the satisfaction (8).

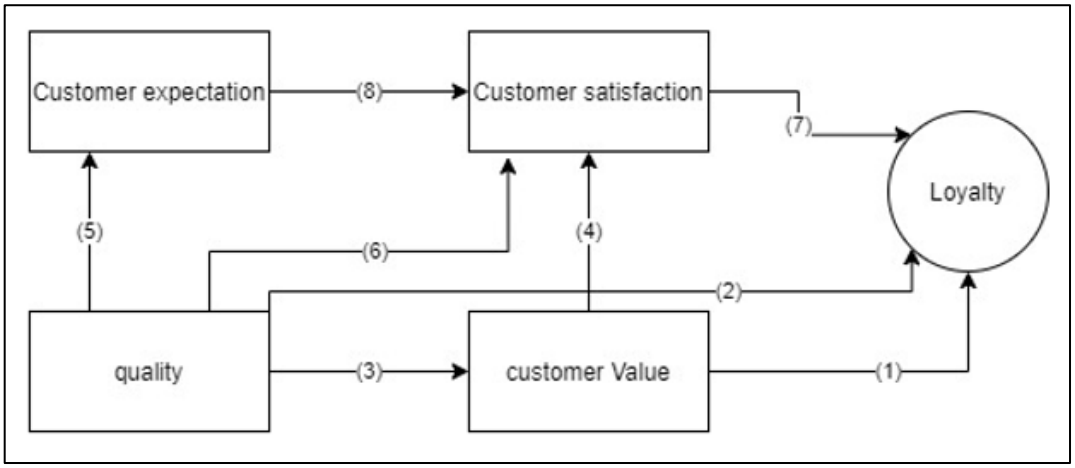

Figure 1 loyalty implications

2.1.3. Loyalty intertwining literatures

According to Meidutė-Kavaliauskienė et al. (2014), not only can the quality of a service or product can be a factor to asses customer satisfaction, but quality can also influence the level of satisfaction. In fact, according to Chumpitaz Caceres and Paparoidamis (2007), the quality of a service leads directly to customer satisfaction. This common relation is considered as one of the main factors of a long and successful customer-company relationship (Meidutė-Kavaliauskienė and 2014). By not considering the customer expectations or how customers can get more benefits than what the purchase costs them, is therefore dangerous in a highly competitive market (Liu and Yen 2010). Indeed, many scholars' definitions regarding quality, focus on the ability for a service to meet the customers' need and expectations (Gionata 2009; Liu and Xie 2013). Likewise, Ajao, et al. (2012), point also that this is the most effective way of generating customer's loyalty. The company won't perceive the service quality if the outcomes of the service does not exceed the customer expectations (Domingo and Nobrega 2009; Huang et al. 2012). The

"SERV13model" (figure 2), introduced by Berry et al. (1988), is a recognized model to capture the quality through the gap between the expectation of the customer and the different elements delivered by the company. In order to be efficient, companies do not only have to meet the customer's expectations but also to perceive the customer's need, translate it into a service/goods and communicate about it. Because the expectations of the customer are built on their previous and ongoing experience, knowing what they value now is not enough as those values could change over time. The results of Flint et al. (2011) suggest that the anticipation of customer value affects positively both customer satisfaction and customer's loyalty. This also has a strong effect on customer's loyalty by operating through customer satisfaction. Companies have to anticipate the needs of their consumers (Flint et al. 2002) as it would ultimately increase the satisfaction and loyalty rate of the service provider (Narver et al. 2004). In fact, aiming to close and overcome the SERVQUAL model's gaps between the company and the customer's expectation, leads to an increase of the company profitability. Indeed, Lo (2012) has proven the existence of a positive correlation between these two (Lo 2012). E-commerce is no stranger to this linkage. Because of the features of the digital market (comparison, cost, competitiveness) (Santos 2003), quality has endorsed an increasing role and has gained a central position in the success of e-retailer (Zehir and Narcıkara 2016).

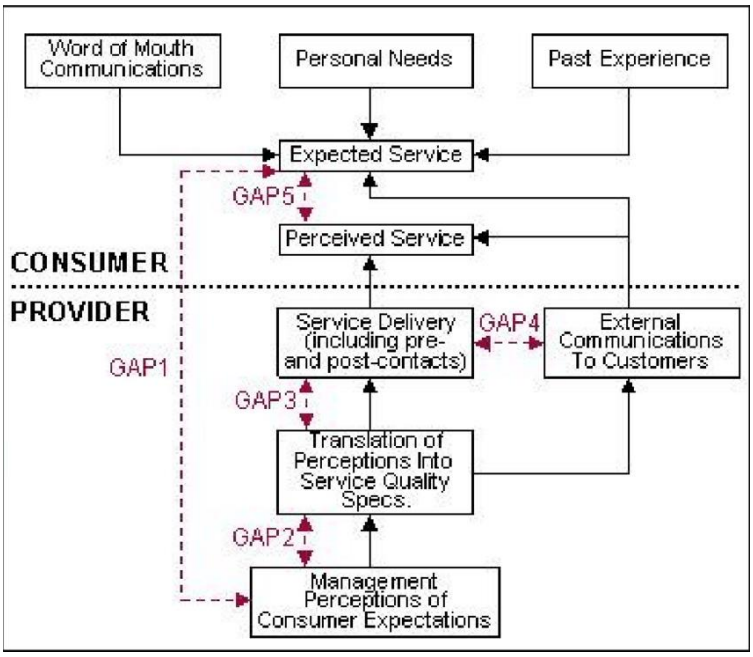

Figure 2 (Berry et al., 1988)

2.2. How logistics shapes the e-commerce

2.2.1. The ecommerce features

E-commerce is defined in the literature as a business model where a consumer visits a website and places an order to buy through a catalog. The business organization by receiving the order will dispatch the goods to the customer (Yu et al. 2016). The website is also the place where all the transactions take place directly between a business organization and a consumer (Mangiaracina et al. 2015). For Zhang and He, (2019), it is simply an individual selling products to another individual by online channels. According to Parasuraman, et al. (2005) the e-commerce requires its transmission channel to be viable and perceived by the

customer as effective and efficient. Hence, the new information and communication technologies play a major role in the relationship between the two parties (Janita and Miranda 2013). This relation is characterized by a large amount of small orders demanding different distribution systems for shipment (Rutneret al. 2003). Logistics will therefore have to adapt to those particularities.

2.2.2. Logistics in the ecommerce

Traditionally, logistics services are shaped to create a smooth flow of goods, information, and cash. However, according to Rabinovich & Knemeyer (2006), this relation is so called broken by the e-commerce context due to a significant growth and importance of the logistics services. Over the expansion of the e-retail in B2C, the effectiveness and efficiency of logistics systems have become critical factors of success for the e-commerce (Ramanathan 2010). Hence, logistics services are established as one of the most expensive operational cost and play a critical role in the e-purchase process due to its specificities (Qin et al. 2019). Due to the specifics characteristics of the e-commerce, which imply a large amount of small orders to several location distant from each other's (Rutner et al. 2003), the framework of the logistics role finds itself enlarged. The logistics complexity coming from constantly demanding customer to look for high standards services (Yu et al. 2016), drive logistics to be a bottle-neck for the e-retail companies. Being trustworthy and reliable are the prerequisites. Companies have to make sure of the success delivery of their service or product, which means to deliver the sales on time, in good shape and in accordance with the customer's requirements (Collier and Bienstock 2006; Fassnacht and Koese 2006). Therefore, logistics quality is defined by Zeithaml et al. (2000) as : "the extent to which a Web

site facilitates efficient and effective shopping, purchasing, and delivery". It is thus essential to achieve customer satisfaction since many studies show that customers consider the logistics performance as an important factor of e-commerce, especially the last mile distribution (Esper et al. 2003).

2.2.3. Last mile theory

The "last mile theory" is defined by Esper et al. (2003), as the critical link between online orders placed by the consumer and the delivery of the product. It includes product transportation, which is the most important component of the order fulfillment process. This means that 85% of the people who have received their order on time will be more compliant to shop again from the same e-retailer. For comparison, only 33% of the disappointed consumers will order again in the future. This bond highlights the importance of the carrier's role in the supply chain. He will act in the last step of the Internet purchase and therefore will leave the last impression of the online buying experience. Through the delivery process, the forwarder will hence print his mark in the customer's mind. By doing so, the role of carrier is tends to be tactical or strategical to the logistics within the online transaction process (Esper et al. 2003). Acknowledging the customer's awareness about the dedicated carrier assigned to his purchase, the company could or could not take full advantage of the image and performance convey by his carrier and profit from the final last miles fulfillment process. The perception of the consumer regarding the delivery process and consequently his buying decision, is affected by his degree of risk-taking and trust in the retailer. Therefore, the information provided on the website and the consumer's faith in the ability of the retailer to achieve the delivery of the goods in good conditions are playing a substantial function in the buying act. Providing an up-to-date information about customer demand would allow products to be delivered in the most efficient way, reducing costs and improving

delivery efficiency (Lee and Whang 2001). The reliability of the carrier and the logistics is not something to left behind as it is a full part of the purchaser thinking process. Achieving the last mile, according to Lee and Whang (2001), is manageable through five strategies which aim to increase the efficiency of the logistics process:

- A Good flow of information is essential and can help improving timeliness and reducing cost of the deliveries;
- The dematerialization of the goods/services provide an asset to reduce the logistics flow;
- Use the leverage shipment to provide a justified shipping price;
- Exchange resources with collaborating companies to reduce the logistics impact of the deliveries locations scattering;
- Use the "clicks and mortar" model in order to transfer the risk of the last mile to the purchaser.

2.2.4. When e-commerce, logistics and loyalty meet

Logistics is part of the entire online service, hence it is relevant to position it in the service process flow in order to assess it properly. For Bauer, Falk, & Hammerschmidt, (2006), the e-service flow and online service can be distinguished in two main dimensions.

- The functional dimensions which includes what is delivered and the service outcome.
- The technical dimensions which involves how the service is delivered and what precedes or follows it.

Similarly to quality or satisfaction, logistics assessments are considered to be part of the post-consumption evaluation. In fact, there is many logistics factors experienced by the customer that are only encountered after the payment (Esper et al. 2003). Studies have found that customers generally consider physical delivery as a very important factor (Esper et al. 2003) and that, in the computer and consumer electronics retailing industry, logistics efficiency is positively associated with a firm performance (Jay et al. 2008).

Logistics quality assessment is no different than the assessment of quality in service/goods. It is also considered to be the fulfillment of the gap between the customers' expectations and the customers' perception of service quality. The "last mile theory" suggests indeed that the client has already quality standards about what the company carrier and service provider should offer prior of placing their order. Hence, in logistics, the quality of a service is the difference between the perceived service and the customer's expectation (Domingo and Nobrega 2009). Due to the high concurrency in the current e-market place, the retailers tend to offer customer-oriented services since the consumer is now acquainted with the e-commerce. All the consumer's previous experiences in regards to online purchasing have shaped his expectations to higher standards. Therefore, nowadays, a large amount of companies choose to provide a high quality service since to be a non-customer oriented company would be dangerous (Liu and Xie 2013). On the one hand, Ramanathan (2010), between others, describes customer's experience through several factors, some of them are based on the logistics efficiency. On the other hand, for quite a few authors, the quality of a e-retailer also includes some logistics features. Among some of this authors, Francis and White (2002), describe the dimensions of e-service quality as: web store functionality, product attribute description, ownership conditions, delivery, customer service and security. Ho and Lee (2007) list, the quality of the information, the security, the ease of use, the availability, the customization, the community, the responsiveness, and the delivery fulfillment as important indicators. Hence, the unfulfillment of the logistics "last mile" or a

poor service level characterized by a late delivery, by an order damages or by a broken promise would be considered as poor quality by the consumer and generate low satisfaction and loyalty (Lee and Whang 2001; Yu et al. 2016). Ramanathan (2010) adds that the main and more significant source of dissatisfaction rise from the lateness or non-arrival of the delivery, inaccuracy of the delivery order or products damages. Moreover, Jay et al. (2008) provide a proof of the positive correlation between the logistics competence and the company performance while Esper et al. (2003) study shows the importance of the physical delivery for the customer. Any satisfaction reached in the post-purchase process will result in an increase of customer's loyalty due to the strong relation between satisfaction and loyalty (Jiang and Rosenbloom 2005). Moreover Zehir & Narcıkara, (2016) support the existence of a significant relationship between service quality and loyalty intentions. However, the study of Ramanathan (2010) suggests that when logistics performance is taken isolated, then there is no evidence of a direct link with the loyalty. This result reminds that the logistics factors have to be considered in a wider range of variables in order to influence the customer's loyalty. Especially in the e-commerce context , achieving customer's loyalty is an asset for the company longevity. Even if the efficiency of the channel is mandatory for viability of the firm (Parasuramanet al. 2005), issues related to customer's loyalty and improving his experience are highly relevant (Janita and Miranda 2013). Firms have therefore to aim to be the best and continually satisfy their customers to reach a long term relationship (Anderson and Weitz, 1992).

3. Research model

3.1. Purpose of the model

The number of e-retailers, whom main objective is to attract and retain the largest amount of customers (Zehir and Narcıkara 2016), keeps increasing in each retailing segment. Gaining loyalty is therefore an important trigger for the commercial and economic success of a firm (Dick and Basu 1994). A wide audience has hence focused on what triggers this loyalty among the consumers. Whereas some focus on the quality, others have studied the impact of the customer satisfaction and expectation on the loyalty rate. For Webb (2010), the loyalty is directly influenced by the service quality, the service value and the customer satisfaction. Other authors have found that those concepts where intertwining and that significant links could be drawn between each other's.

Because the e-commerce is now essential in the B2C market, some authors and companies begin to realize that logistics is no longer only a support to their activities but a whole part of the service and experience. We aim by this study to capture the relation of the logistics efficiency and the customer's loyalty. However, as proven by Ramanathan (2010), there is no direct link between the logistics efficiency alone and the customer's loyalty. In order to find some relations, it has to be considered along with a wider range of variables. Hence, we will merge this theory with the model provided by Janita and Miranda, (2013) which links quality-satisfaction-value-loyalty and image. Out of those five concepts, we will retain the quality, satisfaction and loyalty. We will additionally include the concept of customer expectation since Berry et al.(1988) highlight in their SERVQUAL model its significant aspect on the perceived service quality. In this model, we will however limit the efficiency to the only factor of the service quality. Indeed, Chang et al. (2017) study shows that the service quality is one of the main factors explaining the efficiency. We will then compare this model (figure 4), where we only take logistics quality into account, to a model (figure 3) which measures the relation between the global service quality to the loyalty.

3.2. Hypothesis

This study will pose the following hypothesis (figure 3 & 4):

- H1: Everything else being equal, a lower customer expectation implies a higher satisfaction.
- H1': Everything else being equal, a lower logistics customer expectation implies a higher satisfaction.

Because the satisfaction is induced by the ability to fulfill the gap between the customer expectations and the perceived service (Kumar 2008), low expectations reduce the width of this gap enabling a firm to close the mentioned gap with a poorer quality.

- H2: Everything else being equal, the higher the service quality is, the higher will the customer expectations will be.
- H2': Everything else being equal, the higher the logistics service quality is, the higher the logistics customer expectations will be.

The expectations of the customers are built on their previous and ongoing experiences. It is also influenced by environmental factors and how the latter are perceived by the customer (Claudine and Jay, 2003; Woodall, 2001). Their expectations could thus change overtime. (Kelley and Turley, 2001).

- H3: Everything else being equal, a better service quality will lead to a higher customer satisfaction.
- H3': Everything else being equal, a better logistics service quality will lead to a higher customer logistics satisfaction.

Satisfaction is a result of quality, which is the ability of the retailer to comply with the customer expectations by overcoming the gap between those expectations and the actual product/service delivered (Parasuraman et al. 1985). Indeed, according to Meidutė-Kavaliauskienė et al. (2014), the customer satisfaction is a key factor in assessing the quality of a service.

- H4: Everything else being equal, a higher service quality will lead to a higher loyalty.
- H4': Everything else being equal, a higher logistics service quality will lead to a higher loyalty.

The research of Silva and Thanassoulis, (2005) in the bank service industry show a clear link between the service quality and the customer retention rate or loyalty. Likewise, Janita and Miranda (2013), in their studies on the B2B Spain e-market place, tend to support the positive relationship between the two concepts.

- H5: Everything else being equal, the better the customer satisfaction is the better the loyalty will be.
- H5': Everything else being equal, the better the customer logistics satisfaction is the better the loyalty will be.

Chandrashekaran et al. (2007); Flint et al. (2011); Lam et al. (2004), consider the satisfaction to be a key determinant of the customer's loyalty. Lierop and El-Geneidy (2016) support

that proposition by defining the loyalty among customers on their overall satisfaction with the service.

- H6: Everything else being equal, the overall service quality is positively affected by the logistics quality, product quality, website quality and the value for money.

Heim and Sinha (2001) have identified, through quality, three orders and three procurement fulfillment factors which leads to customer's loyalty. They list the procurement factors as the website navigation and product information. This study will consider them as the website quality and price. For the order fulfillment Heim and Sinha (2001) list the product availability, the timeliness of delivery and the ease of return. We will however align with Ramanathan (2010) and cope with the idea that the main source of logistics quality and satisfaction depends on the delivery accuracy in the matter of time and integrity of the product. The outcome of the service/product's use, so-called "product quality", is also fully part of the global service quality assessment (Baueret al. 2006)

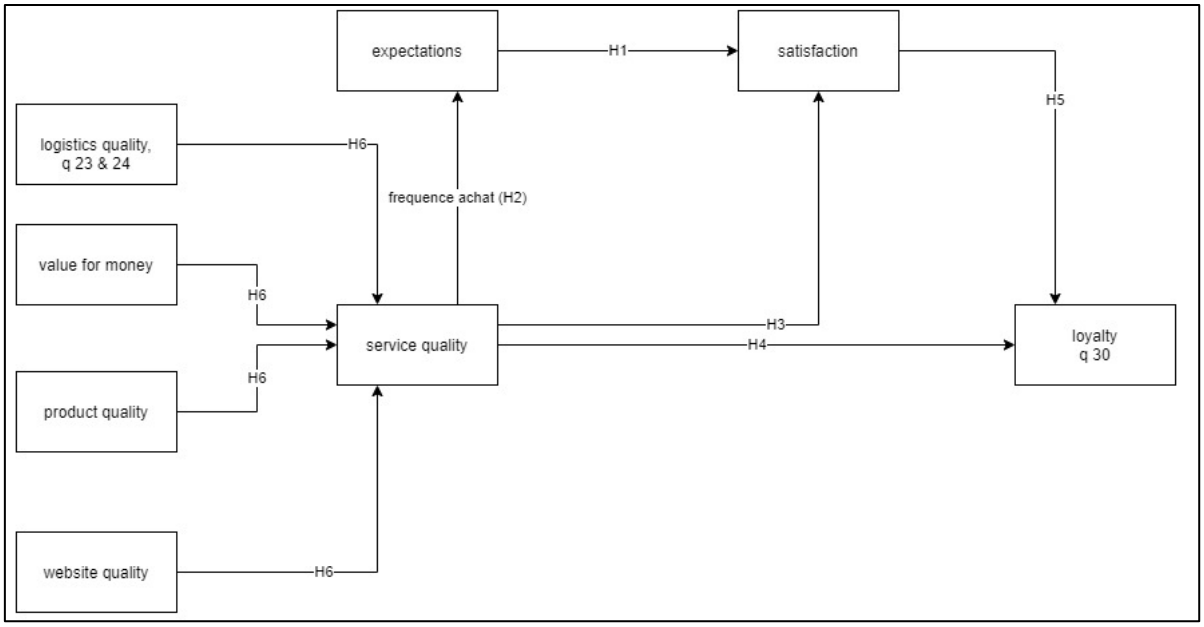

Figure 3 Global Hypothesis diagram

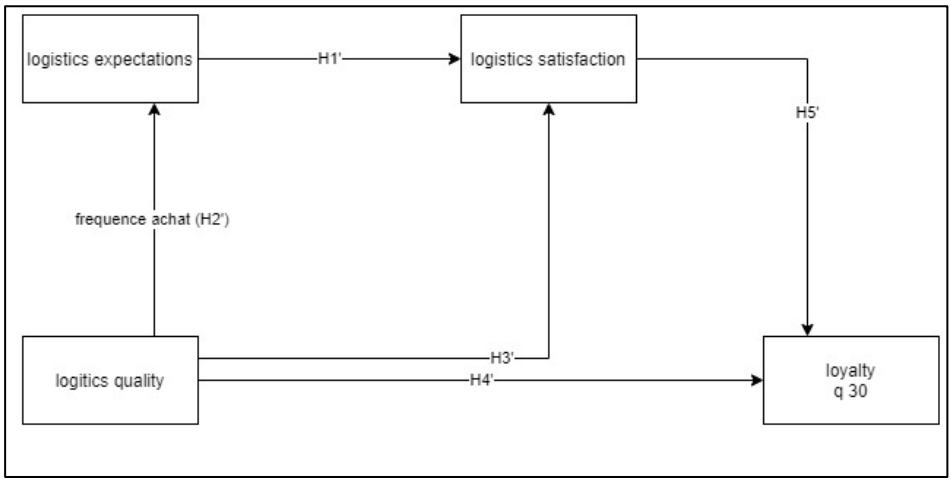

Figure 4 Logistics Hypothesis diagram

4. Methodology:

4.1. Data

Among authors that have studied the loyalty, several methods where used to gather information. On the one hand, some authors collect data based on available customer ratings or feed-backs from several websites (Dellarocas and Wood 2008). For instance, Otim and Grover (2006) , with the support of the bizrate rating website, analyzed the effect of the post purchase factor on the loyalty and have found a significant relation. Likewise, several authors have focused on the negative or positive aspects of the online reviews customers have posted (Chen and Xie 2008). On the other hands, other authors based their study on data collected on primary hand through surveys (Doolin et al. 2005). For example, studies like Jay, John, and Harry (2008) have gathered their data base by collecting information of a postal sent survey. Therefore, the foundation on this study will lay on primary collected data with the use of online broadcast survey.

4.2. The survey

The questions related to the survey broadcast have been separated in four categories:

- In order to capture the individual particularities of the surveyed but also the representativeness of the sample (Vandercammen and Gauthy-sinéchal 2014) we have first focus the survey on the geographic and socio-demographic aspects. This set of questions is followed by a subsidiary question allowing us to sort the respondents who have not purchased through the e-commerce to the population the study wishes to assess;
- As a second step, we considered a series of questions regarding the consumption's habits of the consumers in the e-market place. Following the advice from Allen (2017) study, and due the length of the survey those questions were placed at the beginning of the survey to warm up the respondents. These insights would allow us to draw the characteristics of the Belgians consumers expectations and the habits when it comes to the e-market.
- The third row of question concerns the actual variable of our model and will therefore allow us to withdraw the necessary data to confirm or reject these study's assumptions. They talk about the features of the website, the logistics, the customer's satisfaction and the rating of the purchase.
- Finally, and more importantly, the survey introduces the main question regarding the intention of re-purchase or the retention of the consumer.

In order to get the full attention of the surveyed and get a maximum of information ready to exploit, the survey was written to be completed in approximatively 10 minutes with 31 questions inspired by the insight of the literature review. According to Revilla and Ochoa (2017) this time length is the median optimal for an online survey. A survey too much time consuming or exceeding 20 minutes would increase the quitting rate of the respondents and would provide partially or entirely unusable results.

The first set of questions, concerning the socio demographics information, were based on the example proposed by Allen (2017) on his study "The SAGE Encyclopedia of Communication Research Methods", this in order to capture the unique characteristics of each consumer. The questions will therefore discuss the age, sex, incomes, nationality and residency. The second set of question, regarding the habits of the respondents, has been mainly withdraw from the Comeos study (Comeos 2019) which is the standard retailer study

provider in Belgium. This group discusses the amount of spending, the frequency of purchasing, the buying intention and the drivers and brakes of the e-commerce. The third group provides the assessment of the model variables. Those questions are using a 1 to 5 Likert scale which is perfect to capture qualitative data or source of opinion (Chimi and Russell 2009). The scales have been used to measure the service quality, website quality, price and product quality. A score of "1" would represent very bad appreciation and "5" a very good appreciation. We have chosen a five degree scale in order to allow the respondent to provide a neutral answer (" 3"). The last question regarding the intention of re-purchase is addressed in a binary question "yes" or "no", letting no doubt of interpretation or nuances. Compare to a Likert scale questions, a binary choice is simpler to answer. The latter swept all questionable assumptions regarding the computation of distances and appreciation of the respondent.

In order to deep dive into the models used, it is important to first define the set of variables that have been assessed. First variable taken into account was the expectation, which is considered as the results of the customer's past experiences. The level of expectations have been assessed through the consumptions habits of the respondent. Therefore, the study postulate that the frequency of using the online market, the amount spent during a period of time and the trigger and brake of the online purchase can provide a good evaluation of the customer's expectation level.

The second variable, satisfaction, is described as an emotional response resulting of the difference between the outcome of the product/service and the customers' expectations standards before the purchase (Halsteadet al. 1994). Hence the satisfaction has been evaluated directly by a binary question which asks the respondent if he was satisfied by the service or not. A feeling is indeed difficult to ascertain and a binary simple question gives no room to nuances.

The third variable, service-quality, is seen by Bauer et al. (2006), as having two dimensions one which involves the product or service itself and another which refers to the technical support surrounding the service/goods. The latter, emerging in the pre and post-post-purchase phase, influence the customer's loyalty. The relation between the first dimension and the customer's loyalty is similar to the second dimension (Otim and Grover 2006). The overall service quality has thus to be considered as the merge of different components. Ramanathan (2010) cites the logistics aspects such as the lateness, the non-arrival of the product, the inaccuracy of the delivery or the integrity of the product since the main and more significant sources of dissatisfaction rise from those. Others as Massad and Tucker (2000), highlight the role of the price and the provided product information. He considers those two objects as variables of the customer's risk exposure. Finally, some other authors as Ranganathan and Ganapathy (2002) refer to the conception and smoothness of the website where Francis and white (2002) cites the product description, delivery, customer service, security and quote the importance of the webstore functionality. Hence, the survey includes several Likert scale questions, created to pin down the above cited variables related to price, logistics, product quality and website quality.

The fourth variable, loyalty, is measured by many scholars as the intention to use again a product/service or willingness to recommend it (Chen 2016; Webb 2010). It implies that the loyalty is based on the continuation of the customer to order goods/services which they found qualitative or gain satisfactions from (Webb 2010). Transposed to the online environment loyalty is the consumer intention to buy from a website and not change to another (Flavián et al. 2006). Some as Chen (2016), or Lierop and El-Geneidy (2016), have measured the loyalty as the likeliness of using the service in the future and the likeliness to recommend it

to others. The hereby study measures loyalty as the intention to order one more time on a previously used website.

4.3. Sample & data collection

As a first instance, the survey has been created in an online form enabling the exploitation of the data without too much administration works and providing ready-to-use data on a data stored location (Alan and Laskey 2003). The survey link was broadcasted by two main online methods. The first is the mailing approach. A wide range of links to the survey have been provided to the contact repertory of several persons of different age, gender, income revenue and residency. The purpose was to avoid any bias linked to the common knowledge that people tend to hang with their peers. As long as the questions remain simple, this online anonymous broadcast method allows to receive answers uninfluenced by the interviewer (Kotler et al. 2012).

Then in order to increase the sample and to get more visibility, a second wave of survey answers were collected through some postings on social media pages. Additionally, a final round of data gathering has been done by a sponsored campaign on the social media Facebook. This last round was the most efficient in term of visibility and response rate. Also, this method enables an accurate selection of the socio-demographics characteristics of the respondents. Indeed, this method restricts the access to the survey only to the chosen target. For the purpose of this study, it was reduced to the French speaking persons living in Brussels and/or Wallonia area. According to Kotler et al. (2012), such a collection process is cheap and enhance the honesty of the respondent. Kannan et al. (1998) add that it can be administered in a time efficient manner whereas Evans and Mathur (2005) state that it is convenient for the respondents, allow the researcher to control the sample by choosing the segmentation of the targeted audience, and provides a wide and large sample.

By the end of the mailing and social media campaign a total of 353 answers have been received.

5. DATA

5.1. Data processing & clearance

This study focus on the Brussels and Wallonia area. Hence, twelve profiles which had a residency outside those locations were discarded. Then similarly, out of the remaining answered, all those who have not purchased any goods or services during the past twelve months have been removed. Indeed, the aim was to modelized what triggered the loyalty among people purchasing online and since the loyalty variable was defined as the re-purchase, people who did not make any purchase over the past twelve months were not relevant. The number of respondents reached therefore 325. As a first step to prepare the data for the regression model, all the questions that do not have a numeric outcome have been converted into numerical values. For instance, for the annual salary range question (Annex 1, Q5) which has five possible answers, each of them was translated into a cluster from one to five. Likewise, for the gender question (Annex 1, Q4), was translated into a binary answer. Furthermore, for the motivations to purchase online (Annex 1, Q15), each answer was translated into a binary question. This data preparation facilitates the exploitation of the data by the “GRETL” econometrics software. Below table shows the clean data with the chosen variables for the models.

Table 1 variable description

Variable	Acronyms	Question	Measurement
Expectations	EXPa	Q7: How frequently do you buy something via the Internet?	1 to 5 cluster
	HEXP	Construct of EXPa , EXPb and EXPc	Binary
	EXPb	Q15: What motivate you to buy product online?	set of 8 binary reasons
	EXPc	Q16: What are the main brakes to not buy a product online?	set of 9 binary reasons
Satisfaction	SATs	Q18: On a scale from 1 (really bad to 5 (really good), how would you quote your overall satisfaction online?	1 to 5 scaling
	HSATs	Translation of the Q18 answer into binary under the hypothesis that if the answer is superior to HSAT =1. If not then HSAT =0	Binary
	SATl	Q27: Are you satisfied of the delivery of the mentioned purchase?	binary choice
Service quality	QUAs	Q22: On a scale from 1 (really bad) to 5 (really good) how would you rate the overall cited website?	1 to 5 scaling
	HQUAs	Translation of the Q22 answer into binary under hypothesis that if the answer is superior to HQUAs =1. If not then HQUAs =0	Binary
Logistics quality	QUAl	Q25: On a scale from 1 (really bad) to 5 (really good) how would you rate the delivery quality of the cited website?	1 to 5 scaling
	QUAl1	Q24: On a scale from 1 (really bad) to 5 (really good) how would you rate the order tracking quality of the cited website?	1 to 5 scaling
Product quality	QUAp	Q23: On a scale from 1 (really bad) to 5 (really good) how would you rate the product quality received of the cited website?	1 to 5 scaling
Value for money	QUAm	Q26: On a scale from 1 (cheap) to 3 (too expensive) how would you label the price of the cited order?	1 to 3 scaling
Interface quality	QUAw	Q20: On a scale from 1 (really bad) to 5 (really attractive) how would you rate the design of the cited website?	1 to 5 scaling
	QUAw1	Q21: On a scale from 1 (hard to use) to 5 (very user friendly) how would you rate the interactivity of the cited website?	1 to 5 scaling
Loyalty	LOY	Q31: Do you intend to purchase again in the future from the cited website?	Binary choice

Additionally, some of the harvested survey were also partially incomplete which result in a loss or inefficiency of the data. This has resulted in the exclusion of 11 additional respondents.

One of the main assets of the study lays on the rating of three used commercials website. For the purpose of the regression software and to get additional information, all the respondents have been organized under a lean panel form. It has been constructed to capture the specifics uncalled features of the four most cited websites audited, being Amazon, Zalando, Fnac and Aliexpress. They represent 35,5% of the citation among the 274 quoted websites. All remaining cited websites have been grouped in a category so-called "others" and will be treated as the control sample of the "n-1" categories requested of the panel regression. In addition, this maneuver have allowed to triple the audit related to the website. Furthermore, in order to continue the data clearance, any incomplete answer on Q19 (Annex 1) conducted to the deletion of 70 lines. Moreover regarding the loyalty question, 19 incomplete lines have been spotted and removed. Furthermore, the assessment of several questions related to the delivery features of the purchase were empty which lead to a further investigation. Indeed it has been noticed that most of the blank responses where related to hotel booking, flight booking or other website that do not provide any tangible goods but only an automatic notification or confirmation email of the purchase. Therefore, the study has made the assumption that, for those websites, a neutral score will be assigned if the question was related to deliveries.

Other missing data or inaccuracy could have been deleted as well, for example, a respondent indicating that a shipping rating does not apply to a received material goods. However, this would have caused loss of information, the reduction of the sample and it's representativeness which needed to be avoided. According to Afsa (2016), two solutions could be applied to resolve this issue. First, by creating a category "missing answer" which will be link to an allocated variable. Then, by the extrapolation of the missing value which is thought to be close to another variable. For this study, the second option has been selected, thus, the missing answers have been statistically extrapolated to keep the sample representativeness at an acceptable level. The extrapolation has been done in a way that the data introduced won't change in any circumstances the proportionality of answers.

In the end and after the data clearance, the study has gathered the information of 314 people In order to calculate the representativeness of our sample, it was needed to know accurately the target population (n). According to STATBEL (2019), the governmental organization of Belgian statistics, there are currently 4.823.103 people in Brussels and Wallonia. Our sample of 314 surveyed could be thus considered significant at a statistical confident of 90%. It however do not hit the confidence statistical level of significance of 95% or 99%.

5.2. Regression Methods

"Logistics regression models are widely used to examine and describe a relationship between a binary response and a set of predicator variable " (Fitzmaurice and Laird 2001). Hence, in this case, the dependent variable "*Y"* takes a binomial form "0" or "1". This binary response distinguishes the Logit model from any linear one. This model has the "advantage that it does not assume multivariate normality and equal covariance matrixes" (Trueck and Svetlozar, 2009). Also compare to a linear model, it does not analyze the odds but a logarithmic transformation of it (Leon 1998). Finally, this model is predictive and tends to evaluate the tendency of the dependent variable to take the value "1". It means that the value "1" would be achieved when the utility of "1" is superior to the utility of "0". Our hypothesis H1', H3', H5, H4 are based on a binary answer regarding the dependent loyalty and

satisfaction variable. Hence, the Logit model would enable the accuracy of the study between the set of collected information and its binary outcome. Any interpretation of the outcome would however need to be transformed back to a log scale (Leon 1998). Hence, the below transcription represents our hypothesis under a Logit model.

- Equation 1: H1' & H3' : $SATl \begin{cases} 0 \\ 1 \end{cases}$ $SATl = E\left(\frac{SATl}{X}\right) = G(\beta 1 QUAl + \beta 2 EXP + cons)$

- Equation 2: H4 & H5 : $LOY \begin{cases} 0 \\ 1 \end{cases}$ $LOY = E\left(\frac{LOY}{X}\right) = G(\beta 1 QUAs + \beta 2 SATs + cons)$

- Equation 3: H4' & H5' : $LOY \begin{cases} 0 \\ 1 \end{cases}$ $LOY = E\left(\frac{LOY}{X}\right) = G(\beta 1 QUAl + \beta 2 SATs + cons)$

Where $LOY; QUAs; QUA; QUAw; QUAp; QUAm; SATs; SATl; EXP$ *are the variables represented by the questions listed in the table* 1

Where G is a function following a Normal Law distribution included between 0 and 1, β are the unknown parameter of the model and *cons* a constant.

Since the hypothesis H1, H2, H3, H6 lays on a dependent variable "Y" based on a Likert scale, it was firsts considered to work with the Partial Least Square (PLS) model. Indeed, in the current form of those hypothesis, a Logit model could not apply. As a matter of fact, many scholars favor the Partial Least Square model when it comes to applying a regression to such data (Hult et al. 2019; Janita and Miranda 2013). The PLS model which is based on the statistical variance, is indeed pretty well suited to support the development of theory and any exploratory investigations. It is also appropriate for predictive purpose (Thompson et al. 1995; Wold 1985). Furthermore, the PLS model copes with the issue of having a small data base with missing values and multicollinearity (Pirouz 2012).

However, the PLS model is also referred as a predictive technique which, because of its distribution, does not have any conventional significance test. It would thus be quite complicated to test the accuracy of the proposed model and extract accurate and trustful outcomes. This downside of the PLS model could, according to some, be overcome when we encounter Likert scale. Bearing this in mind, the questions proposed in the survey were transposed to binary questions. For instance, a question as "How would you quote your overall satisfaction online on a scale from "1" (really bad) to "5" (really good)? ", was decomposed in five binary questions from "would you considered your overall satisfaction as really bad, yes or no?" to "would you considered your overall satisfaction as really good, yes or no?". This technique would enable to fall back on a Logit model. Nevertheless, when the question is considered in the hypothesis as a dependent variable, we will make the assumption that the "1" and "2" answers of the Likert scale means a negative answer or a "0" and that "3","4","5" means a positive answer or a "1", this in order to keep the number of hypothesis low.

Regarding the customer expectation dependent variable, "HEXP" has been created as a ratio construct of the different "EXP" as followed:

Equation 4: $HEXP = 0.7\ x\ EXPa + \ 0.15\ x\ \ (EXPb + EXPc)$

$$as\ EXPa \begin{cases} 0\ if\ EXPa\ \in cluster\ 1\ or\ 2 \\ 1\ if\ EXPa\ \in cluster\ 3\ or\ 4\ or\ 5 \end{cases}\ and\ EXPb \begin{cases} 0\ if\ \sum_1^8 EXPb = 0 \\ 0{,}25\ if\ \sum_1^8 EXPb = 1 \\ 0{,}5\ if\ \sum_1^8 EXPb = 2 \\ 0{,}75\ if\ \sum_1^8 EXPb = 3 \\ 1\ if\ \sum_1^8 EXPb > 3 \end{cases}\ and\ \ EXPc \begin{cases} 0\ if\ \sum_1^8 EXPc = 0 \\ 0{,}25\ if\ \sum_1^8 EXPc = 1 \\ 0{,}5\ if\ \sum_1^8 EXPc = 2 \\ 0{,}75\ if\ \sum_1^8 EXPc = 3 \\ 1\ if\ \sum_1^8 EXPc > 3 \end{cases}$$

Now we are able to define remaining hypothesis as per the below transcription

- Equation 6: H1 & H3 : $HSATs \begin{cases} 0 \\ 1 \end{cases}$ $\quad HSATs = E\left(\frac{HSATs}{X}\right) = G(\ \beta 1 QUAs + \ \beta 2 EXP + cons) = G(X'/\beta)$

- Equation 7: H2 : $HEXP \begin{cases} 0 \\ 1 \end{cases}$ $\quad HEXP = E\left(\frac{HEXP}{X}\right) = G(\ \beta 1 \mathrm{QUAs} + cons)$

- Equation 8: H2': $HEXP \begin{cases} 0 \\ 1 \end{cases}$ $\quad HEXP = E\left(\frac{HEXP}{X}\right) = G(\ \beta 1 \mathrm{QUAl} + cons)$

- Equation 9: H6: $HQUAs \begin{cases} 0 \\ 1 \end{cases}$

  $HQUAs = E\left(\frac{HQUAs}{X}\right) = G(\ \beta 1 QUAl + \ \beta 2 QUAw + \ \beta 3 QUAm + \ \beta 4 QUAp + cons) = G\left(\frac{X'}{\beta}\right)$

Where $LOY; QUAs; QUA; QUAw; QUAp; QUAm; SATs; SATl; EXP$ *are represent by the question listed in the table* 1

Where G is a function following a Normal law distribution included between 0 and 1, β are the unknown parameter of the model and cons a constant.

The global model to approach customer's loyalty would therefore be the following:

Equation 10: $\Pr\ (LOY = 1 \mid X)$

$$\begin{aligned} = G\ (\ \_cons\ +\ \beta 1\ x\ EXPa\ +\ \beta 2\ x\ EXPb1\ +\ \beta 3\ x\ EXPb2\ +\ \beta 4\ x\ EXPb3\ +\ \beta 5\ x\ EXPb4 \\ +\ \beta 6\ x\ EXPb5\ +\ \beta 7\ x\ EXPb6\ +\ \beta 8\ x\ EXPb7\ +\ \beta 9\ x\ EXPb8\ +\ \beta 10\ x\ EXPc1 \\ +\ \beta 11\ x\ EXPc2\ +\ \beta 12\ x\ EXPc3\ +\ \beta 13\ x\ EXPc4\ +\ \beta 14\ x\ EXPc5\ +\ \beta 15\ x\ EXPc6 \\ +\ \beta 16\ x\ EXPc7\ +\ \beta 17\ x\ EXPc8\ +\ \beta 18\ x\ EXPc9\ +\ \beta 19\ x\ SATs\ +\ \beta 20\ x\ QUAs \\ +\ \beta 21\ x\ QUAw\ +\ \beta 22\ x\ QUAw1\ +\ \beta 23\ x\ QUAp\ +\ \beta 24\ x\ QUAl1\ +\ \beta 25\ x\ QUAl \\ +\ \beta 26\ x\ QUAm\ +\ \varepsilon\ ) \end{aligned}$$

Or $Pr\ (LOY = 1 \mid X)\ =\ G\ (\ \_cons\ +\ \beta 1\ x\ EXP\ +\ \beta 2\ x\ SATs\ +\ \beta 3\ x\ QUAs\ +\ \varepsilon)$

$$\begin{aligned} Where\ \ Pr(QUAs = 1 \mid X) \\ = G\ (\ \_cons\ +\ \beta 20\ x\ QUAs\ +\ \beta 21\ x\ QUAw\ +\ \beta 22\ x\ QUAw1\ +\ \beta 23\ x\ QUAp \\ +\ \beta 24\ x\ QUAl1\ +\ \beta 25\ x\ QUAl\ +\ \beta 26\ x\ QUAm\ +\ \varepsilon\ ) \end{aligned}$$

$$Pr\ (EXP = 1 \mid X)\ =\ G\ (\ \_cons\ +\ \beta 1\ x\ EXPa\ +\ \beta 2\ x\ EXPb1\ +\ \beta 3\ x\ EXPb2\ + \beta 4\ x\ EXPb3\ +\ \beta 5\ x\ EXPb4\ +\ \beta 6\ x\ EXPb5\ +\ \beta 7\ x\ EXPb6\ +\ \beta 8\ x\ EXPb7\ +\ \beta 9\ x\ EXPb8\ + \beta 10\ x\ EXPc1\ +\ \beta 11\ x\ EXPc2\ +\ \beta 12\ x\ EXPc3\ +\ \beta 13\ x\ EXPc4\ +\ \beta 14\ x\ EXPc5\ +\ \beta 15\ x\ EXPc6\ + \beta 16\ x\ EXPc7\ +\ \beta 17\ x\ EXPc8\ +\ \beta 18\ x\ EXPc9 +\ \beta 20\ x\ QUAs\ +\ \varepsilon)$$

$$\Pr\ (SATs = 1 \mid X)\ =\ G\ (\ \_cons\ +\ \beta 1\ x\ EXP\ +\ \beta 20\ x\ QUAs\ +\ \varepsilon)$$

6. Results

6.1. Descriptive statistics and correlation.

The following table shows details of the sociodemographic variables. First, regarding the gender proportion of the respondents, the sample shows 43% of males and 57% of females which approaches the actual representativeness of the gender Belgian population, being 51,1% female and 48,9% male. Likewise, the age proportion of the respondents tends to also comply with the actual representativeness of the Belgian population. Indeed, the Belgium statistical office, STATBEL (2019), highlights that the percentage of the Belgians between 18-25 is 5,24%, the 25-40 cluster is 19,03% , the 40-55 is 23,34% and the +55 is 52,39%.

Moreover, despite the size of the sample being relatively small, the study achieves to approach quite accurately the results of the Comeos (2019)'s. For example, if we take the question regarding the buying frequency we could see that the results per range only vary of a couple of percent. This finding relativize the default of the sample, only reaching the 90% significance level of confidence. However, our study shows as well that only 5,16% of the respondents haven't purchased online during the last year which is relatively low. Table 2 also revealed that a huge majority of the audit population (75,47%) are in the two higher spending clusters and that only 47,14% would buy goods on a monthly basis or more. Therefore, we could assume that people tend to buy relatively high value products/services online.

Table 2 socio-demographics descriptive statistics

variables		N = 314	%
Age	18-25	26	8,6%
	25-40	72	23,7%
	40-55	85	28,0%
	55 and above	121	39,8%
Gender	Male	124	43%
	Female	180	57%
Incomes	0 to 8351	11	3,50%
	8351 to 11890	20	6,69%
	11890 to 19810	85	27,71%
	19811 to 36300	155	51,59%
	Above	33	10,51%
Frequency of purchase	Once a year	14	4,78%
	3 to 4 times a year	144	48,0%
	Monthly	113	36,31%
	Weekly	25	7,96%
	More than once a week	8	2,87%
Spending during the last three month	-20 €	16	5,74%
	Between 20 and 59€	56	18,79%
	Between 100 and 149€	81	26,43%
	+150 €	151	49,04%

Table 3, shows a set of statistics information describing the variables used in our different hypothesis where the Annex 2 provides the correlation matrix for the different variables. From those tables, The following outputs could be highlighted for the different concepts:

- Expectation : nearly half of the population, 48,95%, are frequent consumers and purchase at least once a month. The main driver highlighted by approximatively half of the respondents for their purchase are, the low price, the large selection of goods, the home delivery and the time saving. The main obstacles to purchase online, well ahead of all others with 69%, is the willing to try the product before the actual purchase. It is followed by the delivery price and the willingness to have a contact with a salesperson (29%). The main drivers to purchase online, come from the price, the selections of products/services offered and the logistics. Whereas the main obstacles, find their origins in the dematerialization of the purchase act. Additionally, according to our indicator, 64,17% of the respondents are considered to have high expectations. Besides, as it could be assumed, the frequency of purchase (EXPa) shows a high correlation rate with average spending's and with the SATs which support H2. On the one hand, the obstacles of the variables like EXPc show a negative correlation with most of the remaining variables. On the other hand, the drivers to purchase online show a positive correlation .

- Quality: in terms of quality, whenever it comes to price, product, logistics, website or overall satisfaction, the vast majority of the respondents with results above 93% describe their experience as qualitative. Their rate reach indeed neutral or higher rank in the Likert scale. Furthermore, between 22,6% and 53,75% of the respondents do not hesitate to score top rating. Therefore the mean of the variables tends to reach high level ("4" on a "1" to "5" Likert scale). The standard deviation is also relevant in order to appreciate the variables. The table show that, following the type of quality, the standard deviation varies between 0,78 and 0,98. People therefore appreciate the quality in a variety of ways, even if they are unlikely to consider it negatively. When it comes to the price (QUAm), 81,98% tends to have a positive opinion, since only 15,11% find it overpriced. In fact, 8,08% find it cheap and 76,81% describe it as good value for money. Moreover, a strong correlation could be observed between the variables assigned to the website quality, QUAw, QUAw1 and the overall service quality (0,69). As expected, a significant correlation also exists between the two websites quality variables (0,62). Lesser correlation factors also appear among all set of quality variables with a positive level between 0,20 to 0,69. This reveals the existence of an interconnection between them.

- Satisfaction : the mean of the HSATs, SATl and SATs are very close to 1 and for all three variables the percentage of answer neutral or higher is above 94%. That converges with the idea that the respondents are very rarely dissatisfied of their purchase. For the logistics satisfaction, only 5,39% of the answers where negative and the proportion is even lower for the global satisfaction HSATs, with 1,52%. The standard deviation of those variables and more especially the SATs are also very low which provides the insight that people satisfaction tends to be quite similar. The most notable correlation with the logistics satisfaction or global satisfaction, occurs with the variable EXPa and all sort of quality variables, except the value for money and logistics. Those correlations provide us reassurance of a possible significant relation regarding our hypothesis H1, H1', H3' & H3. Moreover, it is interesting to note that the correlation between the service satisfaction and the logistics satisfaction has a low correlation rate of 0,0808.

- Loyalty : the descriptive statistics shows here a similar trend to the satisfaction. Only a few people describe themselves as non-loyal to a website since only 3,51% of the intentions to purchase again on a previously used website is negative. The loyalty mean reaches 0,96% and a standard deviation of 0,18. Furthermore, there is a low correlation between the loyalty and all the other variables. The most significant correlations are found in SATL, QUAl and QUAp. Surprisingly the overall satisfaction shows a very low rate of 0,0042.

In general, only a few respondents considered themselves to be dissatisfied, to have experienced bad quality or do not intend to purchase again. That leads the study to believe in an actual relation between those variables. The significance of those relations and their existence will be supported in the further regressions. It is feared that the confidence level of the negative predictions might be affected by the low number of negative answers. Finally, the correlation matrix does not show any clear and strong trend since the overall correlations between the variables are quite low. Nonetheless, a discrete trend could be observed in the intertwining proposed in the figure 3 and figure 4.

Table 3 Variable descriptive statistics.

Variable	Mean	Median	Minimum	Maximum	Standard variation	Count > Mean	Count min	Count of neutral or above
EXPa	2,59	2	1	5	0,81	2,93%	3,63%	48,95%
HEXP	0,64	1	0	1	0,75	64,17%	35,83%	64,17%
EXPb1	0,56	1	0	1	0,50	56,44%	43,56%	56,44%
EXPb2	0,44	0	0	1	0,50	44,15%	55,85%	44,15%
EXPb3	0,57	1	0	1	0,50	56,79%	43,21%	56,79%
EXPb4	0,49	0	0	1	0,50	48,59%	51,41%	48,59%
EXPb5	0,28	0	0	1	0,45	28,10%	71,90%	28,10%
EXPb6	0,42	0	0	1	0,49	42,39%	57,61%	42,39%
EXPb7	0,37	0	0	1	0,48	36,65%	63,35%	36,65%
EXPb8	0,34	0	0	1	0,47	33,84%	66,16%	33,84%
EXPc1	0,67	1	0	1	0,47	67,45%	32,55%	67,45%
EXPc2	0,10	0	0	1	0,30	10,19%	89,81%	10,19%
EXPc3	0,29	0	0	1	0,45	28,81%	71,19%	28,81%
EXPc4	0,23	0	0	1	0,42	22,60%	77,40%	22,60%
EXPc5	0,10	0	0	1	0,30	10,30%	89,70%	10,30%
EXPc6	0,10	0	0	1	0,30	10,19%	89,81%	10,19%
EXPc7	0,00	0	0	0	0,00	0,00%	100,00%	0,00%
EXPc8	0,29	0	0	1	0,45	29,04%	70,96%	29,04%
EXPc9	0,18	0	0	1	0,38	17,92%	82,08%	17,92%
SATs	4,08	4	1	5	0,69	26,11%	0,35%	98,48%
HSATs	0,98	1	0	1	0,12	98,48%	1,52%	98,48%
QUAw	3,80	4	1	5	0,88	22,60%	0,70%	93,44%
QUAw1	3,94	4	1	5	0,89	29,04%	1,29%	94,73%
QUAs	3,99	4	1	5	0,79	26,46%	0,59%	96,96%
HQUAs	0,97	1	0	1	0,17	96,96%	3,04%	96,96%
QUAp	4,39	5	1	5	0,78	53,75%	0,59%	97,66%
QUAl1	4,09	4	1	5	0,98	44,03%	1,76%	95,08%
QUAl	4,16	4	1	5	0,93	46,14%	1,17%	96,14%
QUAm	1,93	2	1	3	0,48	8,08%	15,11%	91,92%
SATl	0,95	1	0	1	0,23	94,61%	5,39%	94,61%
LOY	0,96	1	0	1	0,18	96,49%	3,51%	96,49%

6.2. Test and results

In this section, the results of the regression will be described in details for the aforementioned hypothesis and for the overall loyalty model. In order to do so, we will have a look at the relative strength and sign of the β. This will give us information regarding the direction and intensity of the relationship. However, it is to be noted that the intensity could not be interpreted accurately since they are part of the function G, described in the previous model section, which was created for the Logit model purpose. Therefore, in order to accurately state the intensity of the relation and the proportion to which the variable act on the dependent variable, the marginal value at the mean and slope have been calculated as followed: $y^* = ln((p/1-p))$. The P-value would tell us if the relation is significant. The R^2 of McFadden will provide the explanatory power whereas the confusion matrix will tell us if our model tends to accurately predict the outcome of the dependent variable. The results of the regression H1 to H6 could be found in Annex 3.

- H1 & H3: it could be noticed that the significant variables relative to the overall satisfaction are the variables EXPb1, EXPc3, RXPc9 and a bit less significant are the variables EXPb6, EXPa. Surprisingly, none of the quality factors have any significant impact on the overall satisfaction. Moreover, the marginal effect to the mean is null, meaning that any type of quality change would not impact the probability to be satisfied. We could then question the quality of the model but, even there, the confusion matrix shows an accuracy predictive ratio of 99,8% and a quite high pseudo-R2 of McFadden of 0,734167. Additionally, it could be noticed that the coefficient of the drivers to purchase online is positive whereas having any obstacles tends to have a negative effect on the satisfaction. Finally, the lower the frequency of purchasing is, the higher the satisfaction will be.

- H1' et H3': from the H1 & H3 hypothesis results, we might assume that the H1' & H3' would have follow the same trend. However, we noticed that the most significant variable regarding the dependent variable is QUAl with a significance of 99.99999% followed by EXPb7 (significant at 95%). The confusion matrix has an accuracy rate of 95,7% and the R2 of McFadden has an acceptable level of 0,344. However, it is also showed that even if most of the positive cases are accurately predicted, the prediction accuracy of the negative outputs is only of 32.61%.

- H2: the H2 model regression shows the QUAp at a significant level of 99% and QUAs et 95%. The overall quality has a positive influence on the customers' expectations. The relation between the product quality and the customers' expectation also shows that the less the product quality is, the higher the expectations will be. Even if the significance is low for the top 4 websites, it could be seen that the slopes are different from one another. This provides the insight that the costumers will have different expectations when it comes to the chosen online retailer. Regarding the confusion matrix, this also shows that the global predictions are quite accurate when it comes to positive outcomes, however the model struggles to predict the negative outcomes with an accuracy rate of 12,75%.

- H2': the model H2 has no significant value, a bad accuracy concerning the confusion matrix and could not predict at all any negative value which indicates a total rejection of this hypothesis. A misleading choice of the variables or an unsuitable construct for the HEXP could be an explanation.

- H4 & H5: the regression regarding the H4 & H5 shows the product quality, the price quality and the logistics satisfaction as being highly significant at 99% and the web design quality and the overall satisfaction reaching 95% significance. The confusion matrix has a high accuracy rate but once again fails to predict the negative outputs with a rate of 26,67%. It could also be seen that the QUAm impacts negatively the loyalty whereas the others significant values have a positive impact. The slopes show us that the marginal variation at the mean impacts the probability to reach the customer's loyalty by less than a percent for the all the variables except the logistics satisfaction and QUAm. The R2 of McFadden reaches a 0,4094 level.

- H4' et H5': the regression of the proposed model which links logistics quality and logistics satisfaction to loyalty, highlights that only the logistics satisfaction is significant at a 99% rate. None of the two logistics quality variables have a remarkable marginal effect on the probabilities to reach customer's loyalty. It also shows that the coefficient of the top 4 websites have a negative effect on the loyalty. Thus, since they were the most frequently used E-retailers, it raises an interrogation on the reliability of the model. Moreover, the confusion matrix once again shows a poor rate when it comes to predict the negative values.

- H6: the regression shows that the website design quality and its interactivity are significant at 99% whereas the quality of the delivery reaches a significance of 95%. It also shows that the Zalando factor is significant. The price quality and product quality do not impact significantly the overall quality. The model shows an accuracy of prediction of 97,8% and a high R2 of McFadden of 0,532399. That prediction of the negative cases barely reaches the 30%.

Now that the all hypothesis have been described and tested we will continue the analysis with the overall loyalty model. In the above table 4 we could see the result of this regression. It shows that the variables SATl, QUAm, QUAp appear to be significant at 99%. This finding aligns with the insights provided by the H4 and H5'. Moreover SATs and QUAp show a positive coefficient sign. It tell us that a higer quality product or a better overall satisfaction would lead to a better chance to be loyal. In contrast, it is showed that the price quality has a negative effect. This negative relationship is due to the construct of the QUAm scale where "1" represents a cheap price, "2" a good value for money and "3" an overprice product. Therefore a lower position on the scale represent a better outcome for the customer and thus a higher probability to be loyal.

Additionally, SATs shows a 95% significance, as it was highlighted in the H5 regression. However, the signs of the overall satisfaction factor is negative which goes against the common assumption suggested on the literature. Indeed, several studies consider that there is a positive relationship between the customer's satisfaction and the loyalty. Bearing this in mind, we could have assumed that a higher satisfaction would lead to a higher chance to reach loyalty. Unlike H4', QUAl reaches a significant level of 90%. Additionally, it also appears that some variables assigned to customers' expectations such as one driver (EXPb2) and one obstacle (EXPc2) to purchase online, have a significant negative impact on the customer's loyalty. Finally, it seems that purchasing the goods on Amazon would have a significant negative impact on the customer's loyalty. Furthermore, the negative sign of the coefficient also appears on the remaining three websites of the TOP 4. The same results were found in the H4, H5, H4' and H5' regressions.

Table 4 Logit regression of the global Loyalty model

VARIABLE	COEFFICIENT	ERR. STD	T	p. critique	
const	1,51193	2,51143	0,602	0,54716	
amazon	-1,43040	0,690906	-2,070	0,03842	**
zalando	-0,540722	1,00559	-0,538	0,59077	
fnac	-0,586004	1,29717	-0,452	0,65145	
aliexpress	-1,58075	1,01551	-1,557	0,11956	
EXPa	0,282576	0,661980	0,427	0,66948	
HEXPb	-0,403863	1,03997	-0,388	0,69776	
EXPb1	0,536729	0,646997	0,830	0,40678	
EXPb2	-1,34209	0,633806	-2,118	0,03422	**
EXPb3	0,327593	0,570839	0,574	0,56605	
EXPb4	0,855194	0,669746	1,277	0,20164	
EXPb5	-0,725745	0,593638	-1,223	0,22150	
EXPb6	0,459665	0,630242	0,729	0,46579	
EXPb7	-0,876146	0,594290	-1,474	0,14041	
EXPB8	0,847670	0,653302	1,298	0,19445	
EXPc1	0,914401	0,594990	1,537	0,12433	
EXPc2	-1,69721	0,861079	-1,971	0,04872	**
EXPc3	0,0412659	0,606829	0,068	0,94578	
EXPc4	-0,147636	0,630107	-0,234	0,81475	
EXPc5	-0,00975658	0,899265	-0,011	0,99134	
EXPc6	0,913279	1,06092	0,861	0,38933	
EXPc8	-0,316226	0,658717	-0,480	0,63118	
EXPc9	-0,160260	0,700546	-0,229	0,81905	
SATs	-0,969328	0,483235	-2,006	0,04487	**
QUAw	0,675015	0,427449	1,579	0,11430	
QUAw1	-0,267507	0,403909	-0,662	0,50778	
QUAs	-0,0502860	0,541927	-0,093	0,92607	
QUAp	1,43692	0,356938	4,026	0,00006	***
QUA11	-0,233240	0,334416	-0,697	0,48552	
QUA1	0,616808	0,347868	1,773	0,07621	*
QUAm	-2,47458	0,560009	-4,419	<0,00001	***
SAT1	3,06139	0,716671	4,272	0,00002	***

Moyenne de LOY = 0,965
Nombre de cas 'correctement prédis' = 831 (97,3%)
f(beta'x) à la moyenne des variables indépendantes = 0,003
Pseudo-R2 de McFadden = 0,482399
Log de vraisemblance = -67,2513
Test du ratio de vraisemblance: Chi-deux(31) = 125,355 (p. critique 0,000000)
Critère d'information d'Akaike (AIC) = 198,503
Critère bayesien de Schwarz (BIC) = 350,5
Critère d'Hannan-Quinn (HQC) = 256,713

		Prédit 0	Prédit 1
Actuel	0	12	18
	1	5	819

The overall loyalty model shows a high reliability when it comes to the global prediction with a 97.3% rate. The positive outcomes are predicted with a 99,34% accuracy. However the negative prediction rate only reaches a 40% rate. The McFadden R2 is also significant at a 0,482399 level. Furthermore, the sensibility of the model reaches 99.39% and its specificity reaches 40%. Therefore 99.39% of loyal customers would indeed appear to be loyal and 40% of the non-loyal customer will be stated as such. This imply that 60% of the actual non-loyal customers will be consider by our model as loyal.

Due to the model's low rate of negative prediction, we challenged the choice of the regression's variables, questioning if any additional variable could increase the negative prediction rate. According to some, the inherent characteristics of the consumers would influence how they perceive the quality. Therefore they have an indirect impact on the

customer's loyalty and lead us to believe that a direct impact could exist. Thus in the Annex 3 we have included in the regression the socio-demographics features of the respondents. The results show that by including those variables in the model it leads to an increase of negative prediction accuracy of 13%. This however reduces the significance of the QUALs, SATs, QUAl. It also provides a good significance for the gender and the annual incomes. Thus, according to the sign, a high revenue women is more likely to be loyal to an E-retailer compare to a low income male.

6.3. Discussion of the results

When it comes to the ability to reach satisfaction, the customer expectations are significant, as suggested by H1 and H1'. As it was expected, the negative signs of the variable show that a customer who is used to purchase frequently will be more difficult to satisfy. In regards of the logistics satisfaction, the negative sign of the coefficient could be interpreted in two different ways. On the one hand, it can be interpreted that early adopter customers have high standard regarding the delivery process, but over time and with experience, they will lower those expectations due to disappointments regarding the last miles service. On the other hand, it could tell that the customers have over expectations regarding the logistics service.

When it comes to the customers' expectations drivers and obstacles to purchase online, the most frequently quoted among our respondent's panel are not necessarily the most prevalent in terms of significance. This shows that the presence or absence of those most cited features won't impact significantly the customer's satisfaction. For H1, the main significant factors were related to the gain of time, the wider selection available and the lack of contact with employees. In other words, this implies that customers are getting more demanding and are expecting to get what they want immediately with a good personalized service. An E-retailer should hence aim to focus on the selection of its products and seek to find a way to reduce the social gap of the online channel. A possibility to do so would be by providing tools, enabling customers to find personalized advises. Regarding H1', only the avoidance of a crowded store (variable EXPc7) appears as significant. This is pretty unexpected since none of the main logistics drivers (i.e. home delivery) or obstacles to purchase online (i.e. long delivery delay) appear to be significant.

Unlike the global satisfaction regression (H3), the logistics satisfaction regression (H3') reveals the quality variable as significant. This could mean that the overall satisfaction is mainly driven by the expectations of the consumer whereas in terms of logistics satisfaction, the consumer would look mainly at the presence of quality. The global expectation would come from the lack of product quality and the overall service quality which have respectively a negative and positive coefficient sign in the H2 regression. One could think that a higher product quality would, overtime, lead to raise the probability to be considered as having high customers' expectations, such as the overall quality. However, the signs of the β tends to deliver the opposite idea. Indeed the negative coefficient of QUAp tells that the more a customer encounters a bad quality product the more he would rise his future expectations.

The model however has showed a poor level of accuracy. One explanation could come from the dependent variable construct (HEXP) which has been introduced due to the lack of a direct question in the survey regarding how much demanding the respondent considered themselves. Another explanation could be that customers' expectations are link to other factors than the quality. This, once again, leads us to explore the outcomes that the socio-demographics features of the respondents could bring to the model. Indeed, our particularities and experience shape us. Thus, an individual won't have the same expectation of another only because of his inherent characteristics. Adding the socio-demographics

variable, as it could be seen in Annex 3, increases the rate of the confusion matrix in terms of positive and negative results by 10%. This shows that the average spending and age are significant. Therefore, the younger and the more you spend, the higher would be the chances to be considered as having high expectations. Despite some conceptions, assuming that the older people are the more acquainted they become with the act of purchase and thus could be more demanding. The age factor shows that having more experience in purchasing does not influence positively the odds to be considered demanding in the online market. However, this study was conducted on the e-commerce where the more frequent users are the 18-24 years old, with a large majority (78% users) in Europe (EUROSTAT 2020). Therefore we can assume that, in the e-commerce, the youngers are the more experienced buyers.

Furthermore, according to the literature it was expected that customer's loyalty would be impacted by the customer satisfaction and the perceived quality. Likewise, it was assumed that logistics satisfaction and the quality alone would have a significant impact on the customer's loyalty. The regression H4, H5, H5' support those believes. Indeed, the results show a significant relation between the quality and the customer's loyalty, coping with the literature knowledge, specifying that a good perceived quality would eventually lead to loyalty. This study digs even deeper. It provides the characteristics of the quality which influence the loyalty. Indeed, it shows that the product, the price and the web-design quality are the main quality compounds that impact directly and significantly the loyalty. H4'would however be discarded, since the regression shows no direct link between the logistics quality and the loyalty. Hence, logistics quality alone does not have a significant direct relation with the loyalty but an indirect one through the logistics satisfaction as it was highlighted in H3'. Loyalty would therefore result of a customer who is satisfied by the global service and the logistics service, and perceives the product as qualitative, not overpriced and originated from a well-designed e-commerce Website.

The perceived global service quality (QUALs) however shows no significant link to the loyalty. As per H6 regression, the study provides the insight that QUALs is seen as per the respondents as mainly linked to the quality of the Web design (QUAw), of the interactivity of the website (QUAw1) and of the logistics (QUAl & QUAl1). Those variables could be considered as support features of the global service. In contrast, the H4 regression tells that the perceived quality of the price (QUAm) and the product quality (QUAp), which are considered as the inherent quality features of the goods/service, are significantly linked with the loyalty. Those outcomes lead us to believe that consumers distinguish quality differently. The first part can be seen as the main service experience and the second part as the support experience. Indeed, the consumer treats the support service function differently than the realization/use of the service/product itself.

According to the findings H1 to H6, in order to achieve customer's loyalty a E-retailer would have to provide a good quality product/ service for a good value for money through a good designed website. Moreover, he should pay attention to the support quality to get a good logistics satisfaction rate and should meet his customers logistics expectations. Surprisingly, due to the negative relation between the overall satisfaction and the loyalty, E-retailers should target a one-time online purchaser, provide them with a narrow choice of products without any personalized contact. Even if most of the relations abovementioned cope with the common knowledge, the second part of the statement linked to the idea that the global satisfaction which influences negatively the loyalty, is disturbing. It indeed goes against the current literature and knowledge, leading us to question the accuracy of this outcome. How a consumer who considers himself dissatisfied would consider to buy again a product from the same E-retailer?

It could also be noticed that globally, the results show first that all the regressions models, except H2', have high accuracy when it comes to the confusion matrix rates and have an acceptable R2 of McFadden. Moreover, their outputs regarding the significance are aligning. Therefore it allows the hypothesis H1, H2, H3', H4, H5,H5' and H6 to be considered as validated. However, it is to be noticed that even if those models are statistically significant to predict the positives outcomes, they struggle to predict the negatives ones. One possible root cause of that may be due to the lack of negative answers or how the survey was administered or written.

The results of the global loyalty model mostly cope with the literature showing a deep significance between the quality, satisfaction and the loyalty. But it also goes further underlining the high significance of the logistics satisfaction and providing the specific types of qualities which influence most of the consumers' repurchase behavior. The model indeed shows that above all other quality features, the loyalty would be mostly driven by the price quality and product quality as showed in the figure 3 and figure 4.

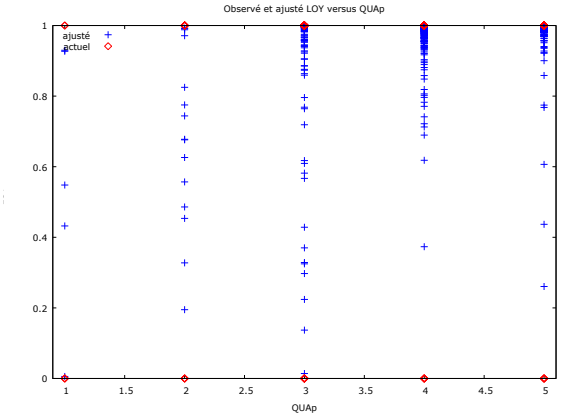

Figure 3 Pr(LOY) as function of QUAp

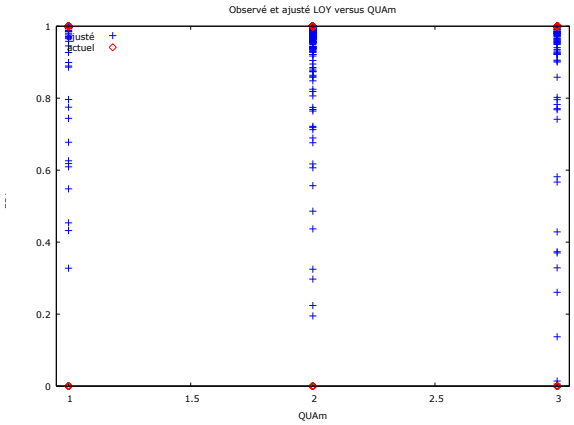

Figure 4 Pr(LOY) as function of QUAm

This means that most people will make their opinion to purchase again from an E-retailer if they find a good price for an adequate quality. The cheaper the proposed value is seen, the more likely a consumer would be loyal. Essentially, the results highlight the variables QUAp, QUam, SATs and SATl to be the main determinant of the customer's loyalty. Moreover, just like the H4 model, the quality of the support functions do not have a significant direct link with the loyalty. However, the global satisfaction and the logistics satisfaction, which are driven mainly by the support quality, share a noticeable relation with the loyalty which is aligned with the findings of both H5 an H5'.

What is surprising is the signs of some variables. For instance, it could be assumed that being part of the TOP 4 most cited websites could increase the odds of loyalty. As a matter of fact, this study shows that in Belgium, 35,5% of online purchasing transit by those three websites. The regression shows however the opposite. Likewise, we expected the obstacles to purchase online (EXPc1 to EXPc9) to have a negative sign and the drivers (EXPb1 to EXPb8) and frequency (EXPa) to be positive but it appear that some of those expectations weren't met. Indeed, three of these obstacles tend to lead to a better loyalty probability whereas three of the drivers decrease the probability to reach customer's loyalty. A clue towards interpreting those unexpected signs would be to look if the E-service provided have succeeded to comply with the drivers and overcome those obstacles. Moreover, similarly to the outcomes of the H5 regression, the global service satisfaction in this model also shows a negative sign (figure 5) which goes against the literature review and common intuition. This also goes against the outcome of the H5' regression which shows that the logistics satisfaction has a positive sign

toward the customer's loyalty (figure 6). Therefore this may question the method used to assess the variable SATs since we haven't found any literature that would support such result. The results also show that, even if they are insignificant, the overall quality, the website interactivity and some drivers to purchase online have a negative impact to the loyalty.

Compared to the H4, H4', H5 and H5' regressions, the global loyalty model monitors the loyalty through a wider set of variables and shows more pronounced slopes. Therefore, it confirms that more variables put altogether strengthen the model's explanation power and increase the value of the variable's coefficient. It also comply with the idea that, to be significant, the loyalty has to be explained in a wider range of variables, not only through the logistics (Ramanathan 2010) or through any single features. The global loyalty model provides as well a higher prediction rate than the model H5/H4, where the loyalty is explained only by the overall satisfaction and quality.

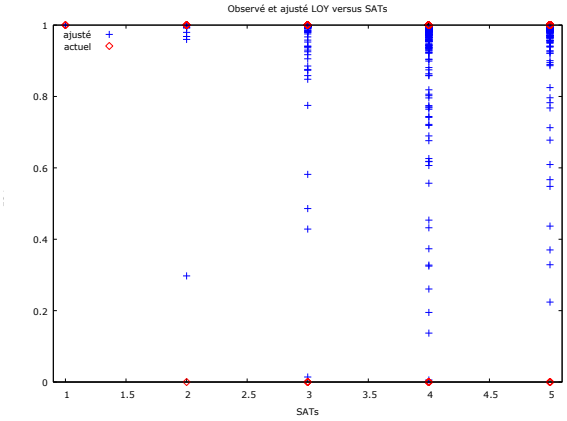

Figure 5 Pr(LOY) as function of SATs

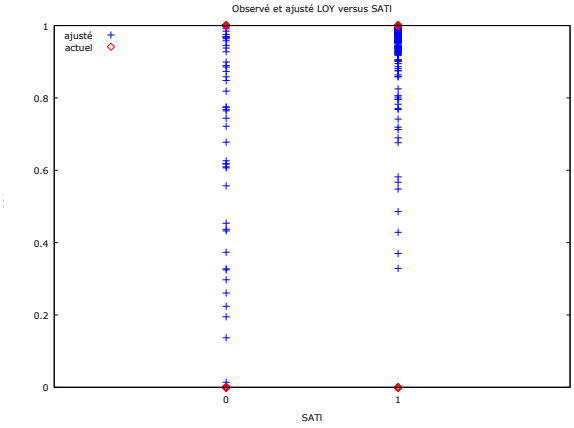

Figure 6 Pr(LOY) as function of SATl

Furthermore, the adjustment of the global loyalty model with the socio-demographics variable, found in Annex 3, provides a better accuracy of the prediction matrix (98%). Specifically, it raises the negative prediction rate above the 50% mark. It therefore highlight that the intention to repurchase would dependent also from the inherent characteristics of the individual and not only from their perception of the quality and satisfaction. Additionally, the gender, the incomes and the spending are showed by this regression to be significant on the probability to be loyal. In our model we see that a women with high income would therefore have a higher probability to purchase again from the same E-retailer than a man with lower incomes. Also, it shows that the overall satisfaction however is no longer significant. Finally, some of the coefficients of the drivers and obstacles to purchase online switched signs due the addition of the socio-demographics variables to the global loyalty model. As a matter of fact, Russo et al. (2016) findings have also showed that the sign of the relation of some variables depend on the presence or absence of other factors.

7. Conclusion

The main target of this study was to provide a predictive model that highlight the direct or indirect factors that influence customer's loyalty in the emerging market of the e-commerce. Since the booming of the E-market has gained importance in our economy, we have seen a large number of start-ups or well established companies investing in the Internet channels in order to capture potential additional margin and market-shares. This new dematerialized economical basket is full of opportunities to benefit from. Nonetheless, none of those opportunities bring as much financial gain than a good customer retention rate. Investing in the customer's loyalty is indeed cheaper than gaining new customers (Slater and Narver 2000) since they are more prompt to increase their spending (Anderson and Srinivasan 2003) and thus increase the turnover of a company.

Moreover, the ability to retain customers is considered to be a key asset for the survival of a company and a key advantage (Kumar et al. 2013) in such a competitive market as the e-commerce. Thus the ability to achieve customer's loyalty is a key factor in the way to success (Dick and Basu 1994). Therefore, defining which factors lead to the customer's loyalty is a subject that has been discussed during a long time in the literature. Many authors have proposed different models and approaches to understand customer's loyalty and this studies is no exception. Based on the literature, we have investigated several models in order to identify not only the direct but also the indirect intertwining of several concepts. The regressions described in Section 3 rely on first-hand data which has been collected through an online survey. The questions administered have the purpose to capture the value of the inherent characteristics of the customers and to measure how customers perceived the quality and how they feel satisfied. The results show that not all factors toward customer's loyalty could be found in the product itself. They can also lay in the support services or the knowledge that firms held on their consumers. Other factors, as the socio-demographics variables, are even out of retailer's direct reach which highlights the importance to consider those variables when targeting the audience.

The models proposed do not only take care of the concepts that influence customer's loyalty but also what influence those concepts. They provide the insights of the indirect relations and features that, in the end, influence loyalty. It also provides a list of the characteristics that the customers held and pay attention to and also what drives them to purchase again from the same E-retailer. Regarding the logistics loyalty, the outcomes of the study show that it is achieve through satisfaction and not by the perceived quality itself. Therefore, it proves that the logistics factor could be a great source of frustration and dissatisfaction regarding the last mile delivery expectation. Thus, the good management of the logistics is an efficient leverage to retain customers.

Another interesting insight, provided by the global model which includes the sociodemographic variables, is that somehow e-commerce could achieve loyalty without global satisfaction. This finding supports the study of Russo et al. (2016) and the study of Hansemark and Albinsson (2004) who explain, respectively, this outcome as a result of customer laziness or simply by customer's habits.

Additionally, the results tell us that the most frequently used e-commerce website do not favor loyalty even if they accumulate most of the purchases upon the surveyed. This may support the hypothesis that laziness or habits lead people to continue buying even if they don't intent to do so. Another explanation could also be found in the company's marketing strategy. Indeed, the most frequently used e-retailers are the most referenced online. Their high visibility therefore corner a big share of the online exposure.

Finally the model shows that consumers tend to consider the quality of the support service separately and differently from the inherent quality of the product/service. The former, impacts the satisfaction and the latter impacts the loyalty.

To sum up, this study found that single factors alone can't explain customer's loyalty in the e-commerce. It highlights the complexity of the process that leads the customer to intend to purchase again. This process is not only based on the features of the product, the global service or the satisfaction, but also on the perception, the experience and the charcteristics of the consumers themselves. It shows that loyalty is not something triggered abruptly with the switch of one variable. Indeed, the loyalty will depend on the alignment and the overall composition of each variable. Moreover, some consumers could also react erratically because of laziness or habits. A perfect formula or recipe of the loyalty could therefore not cover all the consumer behaviors since everyone could react in their own way regarding what drive them to become loyal.

8. Critics, limits and future research

This research present however some limitations. The more obvious one is the significance of the surveyed sample that only achieves a 90% rate. In order to get 99% rate, the insight of several more respondents would have been necessary. Moreover, the sample shows a very low rate of people who have not purchased anything online in the past 12 months. This may result of a bias regarding the collection method which was mainly conducted online and by a mailing campaign. Therefore all the respondents might be already familiar with the available online tools and could be more prompt to purchase through the Internet than an online novice.

The negative predictive rate of most the models presented were also quite low which may result from the lack of people providing a negative answer or from the manner the survey was written. Indeed the set of questions regarding the quality and satisfaction were not tested in a prior study. Hence, we did not have any literatures that support the neutrality of the questions nor their relevance to assess their link to the concepts. The order of the questions might have also influenced the surveyed. For example, the global satisfaction (Q22, Annex 1) is seen as highly correlated to the two previous questions (Q20 and Q21, Annex 1).

Furthermore, the study may have overseen other factors that were also discussed in the literature in order to reach customer's loyalty. Among others, this could include the risk perceived by the customers, the customers value or any additional socio-demographics consumers characteristics.

Finally this study only reflects the perception of Brussels and Wallonia residents who have their own culture and traditions which could influence their purchase behaviors. We could therefore not extend, without prior verifications, the outcomes of this study to a foreign market.

Aside from those limitations, the study highlights several findings which would deserve attention. Indeed, for further research on the B2C e-commerce loyalty, we could emphasis the need of a larger sample scattered on a more global scale. Future studies could also test a different method of assessing the proposed concepts (customers expectations, perceived quality, customers satisfaction) or even propose additional concepts that are intertwined to customer's loyalty. Furthermore, they could also identify how online customers perceive the support service compare to the inherent quality of the service or to dig deeper into the variables that influence the concepts abovementioned. Those additional insights could provide the retailer a standard operation procedure to maximize its retention rate.

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Annex

Annex 1: Original survey.

Here under lay the survey originally broadcasted in French for the purpose of the study. The Survey have created and conducted with Ivonne Riveron Zarate in 2019

Achats belges en ligne

Bonjour dans le cadre de notre mémoire à l'Unamur nous recherchons diverses informations concernant vos habitudes de consommation en ligne. Un petit coup de pousse de votre part en nous offrant 5 minutes de votre temps serait plus que grandement apprécié afin de boucler la recherche.

Merci d'avance pour votre considération et votre temps.

Si besoin ou pour plus d'information vous pouvez nous contacter par mail ....iriveronza@gmail.com ou brlobet@gmail.com

*Obligatoire

1. **Quel est votre âge?** *

2. **1) Dans quelle région habitez-vous?** *
   Une seule réponse possible.
   - ◯ Wallonie
   - ◯ Flandre
   - ◯ Bruxelles
   - ◯ Autre : _____

3. **2) Quelle est votre nationalité?**

4. **3) Êtes-vous ?** *
   Une seule réponse possible.
   - ◯ Femme
   - ◯ Homme

5. **4) Parmi quelle tranche salariale se trouve votre revenu annuel ?**
   Une seule réponse possible.
   - ◯ de 8 351 à 11 890 €
   - ◯ de 11 891 à 19 810 €
   - ◯ de 19 811 à 36 300 €
   - ◯ Autre : _____

6. **5) Avez-vous acheté des produits/services en ligne ces 12 derniers mois ?**
   Une seule réponse possible.
   - ◯ Oui
   - ◯ Non

7. **6) A quelle fréquence achetez-vous sur internet ?**
Une seule réponse possible.

- ◯ Une fois par an
- ◯ 3 à 4 fois par an
- ◯ De façon mensuelle
- ◯ De façon hebdomadaire
- ◯ Plus d'une fois par semaine

8. **7) Combien avez-vous dépensé sur Internet ces trois derniers mois ?**
Une seule réponse possible.

- ◯ Moins de 20€
- ◯ Entre 20€ et 59€
- ◯ Entre 100€ et 149€
- ◯ Plus de 150€

9. **8) Lors d'un achat en ligne, dans quel ordre , classez-vous les 3 facteurs suivants?**
Une seule réponse possible par ligne.

	rapport qualité prix	délai de livraison	prix
Premier lieu	◯	◯	◯
Deuxième lieu	◯	◯	◯
Troisième lieu	◯	◯	◯

10. **9) Parmi les 3 sites web visibles ci-dessous sur lequel seriez-vous le plus à même d'effectuer des achats?**
Plusieurs réponses possibles.

- ☐ Option 1
- ☐ Option 2
- ☐ Option 3

Option 1

Option 2

Option 3

11. **10) Sur une échelle de 1 à 5, quel est l'impact d'une promotion sur vos habitudes de consommation en ligne?**
Une seule réponse possible.

	1	2	3	4	5	
je n'y fais pas attention	◯	◯	◯	◯	◯	j'y suis fortement receptif(ve)

12. **11) Parmi les 3 images visibles ci-dessous, laquelle vous attire le plus pour visiter le site web:**
Une seule réponse possible.

- ◯ Option 1
- ◯ Option 2
- ◯ Option 3

Option 1

Option 2

Option 3

13. **12) A quelle fréquence achetez-vous ces produits, 1 étant peu fréquemment et 5 très fréquemment?**

Une seule réponse possible par ligne.

	1	2	3	4	5
Habillement: vêtements, chaussures	◯	◯	◯	◯	◯
Voyage: hôtel, tickets d'avion, train, bateau	◯	◯	◯	◯	◯
Loisirs: livres,événements, concert, théâtre, sport, musique, film, jeux vidéos, jouets, décoration	◯	◯	◯	◯	◯
Matériel informatique: programmes, appareils électroniques, smartphones	◯	◯	◯	◯	◯
Produits de beauté	◯	◯	◯	◯	◯
Alimentaires	◯	◯	◯	◯	◯
Autres (objet en tout genre)	◯	◯	◯	◯	◯

14. **13) Pensez-vous acheter plus de produits sur Internet dans l'avenir?**

Une seule réponse possible.

- ◯ Certenaiment
- ◯ Probablement
- ◯ Neutre
- ◯ Probablement pas
- ◯ Certainement pas

15. **14) Quels sont les facteurs principaux qui vous poussent à acheter en ligne ?**
Plusieurs réponses possibles.

- [ ] Gain de temps
- [ ] Le prix plus attractif
- [ ] Je peux acheter des produits non disponible en magasin
- [ ] Les biens sont livrés chez moi
- [ ] Les promotions
- [ ] La sélections de produits est plus large, je trouve plus facilement mon choix
- [ ] J'évite la foule en magasin
- [ ] Je peux comparer les offres et commentaires d'autres

16. **15) Parmi les propositions suivantes, pour quelles raisons vous n'achèteriez pas sur Internet?**
Plusieurs réponses possibles.

- [ ] Je veux voir, essayer le produit avant de l'acheter
- [ ] J'ai accès à tous les produits/services dont j'ai besoin en magasin physique
- [ ] Je veux un contact direct avec le vendeur/vendeuse pour avoir des informations
- [ ] Je n'aime pas donner mes données personnelles sur le web
- [ ] J'ai de sérieux doutes sur le niveau de sécurité des achats en ligne
- [ ] Je ne veux pas utiliser de carte de crédit ou n'en possède pas
- [ ] Je dois être à la maison quand les produits sont livrés
- [ ] Je dois payer le prix de la livraison
- [ ] Les délais de livraison sont long

17. **16) Combien avez-vous dépensé en ligne récemment pour les secteurs ci-dessous ?**
Une seule réponse possible par ligne.

	0€	1€-20€	20€-100€	+100€
Habillement: vêtements, chaussures	◯	◯	◯	◯
Voyage: hôtel, ticket d'avion, train, bateau	◯	◯	◯	◯
Loisirs: livres,événements, concert, théâtre, sport, musique, film, jeux vidéos, jouets, décoration	◯	◯	◯	◯
Matériel informatique: programmes, appareils électroniques, smartphones	◯	◯	◯	◯
Produits de beauté: soins	◯	◯	◯	◯
Alimentaires	◯	◯	◯	◯
Autres (objet en tout genre)	◯	◯	◯	◯

18. **17) En général, êtes-vous satisfait(e) de votre expérience en ligne ?** *
Une seule réponse possible.

	1	2	3	4	5	
absolument pas	◯	◯	◯	◯	◯	très satisfait

19. **18) Sur quels sites achetez-vous fréquemment en ligne ? Citez-en 3** *

20. **19) Pour chacun de ces sites, attribuez une note de 1 à 5 pour la mise en page. 1 étant très mauvaise et 5 très attractive.**
Une seule réponse possible par ligne.

	1	2	3	4	5
option 1					
option 2					
option 3					

21. **20) Pour chacun de ces sites, attribuer une note de 1 à 5 pour l'interactivité. 1 étant difficile à utiliser et 5 très intuitif.**
Une seule réponse possible par ligne.

	1	2	3	4	5
option 1					
option 2					
option 3					

22. **21) Veuillez attribuer une note générale de 1 à 5 à ces trois sites. 1 étant très mauvaise et 5 très bon.**
Une seule réponse possible par ligne.

	1	2	3	4	5
Option 1					
Option 2					
Option 3					

23. **22) De 1 à 5 veuillez noter la qualité des produits reçus sur ces 3 sites web. 1 étant très mauvaise et 5 très bon.**
Une seule réponse possible par ligne.

	1	2	3	4	5	ne s'applique pas
Option 1						
Option 2						
Option 3						

24. **23) Sur une note de 1 à 5 veuillez noter la qualité du suivi de commande de ces trois sites web. 1 étant très mauvais et 5 très bon.**
Une seule réponse possible par ligne.

	1	2	3	4	5	ne s'applique pas
site web 1 précédemment cité						
site web 2 précédemment cité						
site web 3 précédemment cité						

25. **24) Sur une note de 1 à 5 veuillez noter la qualité de la livraison de ces trois sites web. 1 étant très mauvaise et 5 très bon.**
Une seule réponse possible par ligne.

	1	2	3	4	5	ne s'applique pas
site web 1 précédemment cité	◯	◯	◯	◯	◯	◯
site web 2 précédemment cité	◯	◯	◯	◯	◯	◯
site web 3 précédemment cité	◯	◯	◯	◯	◯	◯

26. **25) Comment qualifieriez-vous le prix pratiqué pour ces commandes?**
Une seule réponse possible par ligne.

	pas cher	bon rapport qualité/prix	trop cher	ne s'applique pas
site web 1 précédemment cité	◯	◯	◯	◯
site web 2 précédemment cité	◯	◯	◯	◯
site web 3 précédemment cité	◯	◯	◯	◯

27. **26) Êtes -vous satisfait(e) de la livraison de ces 3 commandes?**
Une seule réponse possible par ligne.

	oui	non	ne s'applique pas
site web 1 précédemment cité	◯	◯	◯
site web 2 précédemment cité	◯	◯	◯
site web 3 précédemment cité	◯	◯	◯

28. **27) Si non, pourquoi?**
Plusieurs réponses possibles.

	la livraison n'est pas arrivée à temps ou avec du retard	le produit livré ne correspondait pas à ma commande	le contenu était endommagé	une partie de la commande manquait	le produit n'est jamais arrivé	ne s'applique pas
site web 1 précédemment cité	☐	☐	☐	☐	☐	☐
site web 2 précédemment cité	☐	☐	☐	☐	☐	☐
site web 3 précédemment cité	☐	☐	☐	☐	☐	☐

29. **28) Avez-vous introduit un commentaire/notation à propos des dits sites web?**
Une seule réponse possible par ligne.

	oui	non
site web 1 précédemment cité	◯	◯
site web 2 précédemment cité	◯	◯
site web 3 précédemment cité	◯	◯

30. **29) Sur quel support cette notation/commentaire a-t-il été introduit?**

Une seule réponse possible.

- ◯ via un commentaire sur les réseaux sociaux
- ◯ via un commentaire sur le site web
- ◯ en attribuant une note sur le dit site web

31. **30) Achèteriez-vous à nouveau auprès de ces sites web?**

Une seule réponse possible par ligne.

	oui	non
site web 1 précédemment cité	◯	◯
site web 2 précédemment cité	◯	◯
site web 3 précédemment cité	◯	◯

Annex 2: variable correlation matrix.

Correlation Coef for the observation 1 - 854
5% critical value (bilateral) = 0,0671 for n = 854

EXPa	HEXP	EXPb1	EXPb2	EXPb3	
1,0000	0,8389	0,3013	0,0459	0,0803	EXPa
	1,0000	0,2912	0,0326	0,1143	HEXP
		1,0000	0,0296	-0,0750	EXPb1
			1,0000	-0,1528	EXPb2
				1,0000	EXPb3
EXPb4	EXPb5	EXPb6	EXPb7	EXPB8	
0,2001	0,0233	0,1073	0,2245	0,0706	EXPa
0,1845	0,0146	0,1291	0,2390	0,1083	HEXP
0,3250	0,0606	-0,0254	0,3153	0,0144	EXPb1
0,0085	0,1367	0,0439	-0,1281	0,0918	EXPb2
-0,0836	-0,0331	0,1407	-0,0332	-0,0006	EXPb3
1,0000	0,1166	0,0383	0,1843	0,0374	EXPb4
	1,0000	-0,0039	-0,0106	-0,0122	EXPb5
		1,0000	0,0950	0,0025	EXPb6
			1,0000	-0,0047	EXPb7
				1,0000	EXPB8
EXPc1	EXPc2	EXPc3	EXPc4	EXPc5	
-0,0544	-0,0753	-0,1544	-0,0996	-0,0968	EXPa
-0,0363	-0,1199	-0,1144	-0,1078	-0,0922	HEXP
0,0348	-0,0555	-0,0878	-0,0504	-0,0596	EXPb1
-0,0467	-0,2059	-0,0708	-0,0913	0,0477	EXPb2
0,0549	-0,0110	0,1425	0,0022	-0,0309	EXPb3
-0,0545	-0,1261	-0,1063	-0,0268	-0,0213	EXPb4
0,0396	-0,0211	0,0510	0,0670	0,0537	EXPb5
-0,0362	-0,0774	-0,0590	-0,1519	0,0210	EXPb6
-0,0421	-0,0875	-0,0760	0,0364	0,0060	EXPb7
-0,0313	-0,0200	-0,0232	0,0573	-0,0308	EXPB8
1,0000	0,0109	0,1494	-0,0309	-0,0440	EXPc1
	1,0000	0,1277	0,0494	0,0386	EXPc2
		1,0000	-0,0037	0,0311	EXPc3
			1,0000	0,2128	EXPc4
				1,0000	EXPc5
EXPc6	EXPc8	EXPc9	SATs	HSATs	
-0,1136	-0,0431	0,1395	0,2371	0,0087	EXPa
-0,0502	-0,0160	0,0995	0,1857	0,0258	HEXP
-0,0242	-0,0103	0,0717	0,1281	0,1222	EXPb1
0,0202	0,0546	0,0459	0,1197	0,1105	EXPb2
0,0671	0,0998	0,1301	-0,0436	-0,0891	EXPb3
0,0288	0,0231	0,1384	0,0779	0,0635	EXPb4
0,1253	0,1969	-0,0068	-0,0101	0,0777	EXPb5

0,0558	0,0933	0,1059	0,1828	0,0486	EXPb6
-0,0232	0,0166	0,0882	0,0539	0,0350	EXPb7
-0,0772	0,2294	0,0853	0,0011	0,0283	EXPB8
-0,0800	-0,0290	-0,0469	-0,1526	-0,0251	EXPc1
-0,0494	-0,1302	-0,0665	-0,1183	-0,1795	EXPc2
0,0080	-0,0936	-0,0747	-0,1764	-0,1743	EXPc3
0,1697	0,0367	-0,0772	-0,1693	-0,0243	EXPc4
0,2933	0,0123	-0,0177	-0,0513	-0,0208	EXPc5
1,0000	-0,1131	-0,0362	-0,0847	-0,0214	EXPc6
	1,0000	0,1922	-0,0050	-0,0047	EXPc8
		1,0000	-0,0510	-0,1165	EXPc9
			1,0000	0,4159	SATs
				1,0000	HSATs
QUAw	QUAw1	QUAs	HQUAs	QUAp	
0,1487	0,2017	0,2011	0,0376	-0,0728	EXPa
0,1413	0,1923	0,2125	0,0231	-0,0682	HEXP
0,0728	0,0918	0,1305	0,0368	-0,0454	EXPb1
0,0857	0,0710	0,1110	0,0477	0,0486	EXPb2
-0,0950	-0,1046	-0,0901	-0,0858	-0,1221	EXPb3
0,0415	0,0444	0,0084	-0,0323	-0,1262	EXPb4
-0,0168	-0,0199	-0,0218	0,0198	-0,0321	EXPb5
0,0456	0,0585	0,0750	-0,0135	-0,0096	EXPb6
0,1135	0,1127	0,0963	0,0924	-0,0189	EXPb7
-0,0332	-0,0142	0,0627	0,0979	-0,0022	EXPB8
-0,1280	-0,0965	-0,0912	-0,0358	-0,0084	EXPc1
-0,0682	-0,0358	-0,0624	-0,0530	0,0103	EXPc2
-0,1043	-0,0945	-0,1193	-0,0077	-0,0197	EXPc3
-0,0833	-0,0453	-0,0752	0,0306	-0,0658	EXPc4
-0,0670	-0,1134	-0,0329	0,0376	0,0034	EXPc5
0,0067	-0,0663	-0,0087	0,0146	-0,0345	EXPc6
-0,0559	-0,0446	-0,0147	-0,0068	-0,0322	EXPc8
-0,0979	-0,0467	-0,0187	-0,0416	-0,0969	EXPc9
0,2488	0,2284	0,3121	0,0802	0,1607	SATs
0,1130	0,0569	0,1065	0,0893	0,0624	HSATs
1,0000	0,6276	0,6941	0,3317	0,3244	QUAw
	1,0000	0,6959	0,3265	0,2788	QUAw1
		1,0000	0,4873	0,3515	QUAs
			1,0000	0,2030	HQUAs
				1,0000	QUAp
QUAl1	QUAl	QUAm	SATl	LOY	
0,0628	0,0642	-0,0313	0,0472	-0,0012	EXPa
0,0033	0,0317	-0,0133	0,0567	0,0083	HEXP
0,0693	0,0212	-0,0056	0,0728	0,0376	EXPb1
-0,0220	-0,0207	-0,1015	0,0241	-0,0353	EXPb2
-0,0474	-0,0257	0,0798	-0,0301	-0,0124	EXPb3
-0,0634	-0,0733	-0,0238	-0,0378	-0,0054	EXPb4

-0,0135	0,0150	-0,0226	-0,0124	-0,0647	EXPb5
0,0199	0,0285	-0,0028	0,0367	0,0092	EXPb6
0,0759	0,0781	0,0255	-0,0230	-0,0133	EXPb7
-0,0010	0,0390	-0,0556	0,0501	0,0558	EXPB8
-0,0732	-0,0870	0,0077	-0,0551	0,0032	EXPc1
-0,0382	0,0181	0,0172	-0,0054	-0,0198	EXPc2
-0,0651	-0,0545	0,0450	-0,0200	0,0090	EXPc3
-0,0285	-0,0731	0,0327	-0,0695	-0,0186	EXPc4
0,0366	-0,0033	-0,0066	0,0297	0,0228	EXPc5
-0,0144	0,0015	-0,0235	-0,0397	0,0012	EXPc6
-0,0021	0,0030	0,0131	0,0155	-0,0180	EXPc8
-0,0170	-0,0197	0,0240	-0,0373	-0,0435	EXPc9
0,2009	0,1693	-0,0821	0,0808	0,0042	SATs
0,0895	0,0415	-0,0585	0,0551	0,0282	HSATs
0,3154	0,2621	0,0054	0,1873	0,1734	QUAw
0,3065	0,2711	-0,0921	0,1545	0,1170	QUAw1
0,3588	0,3176	-0,0274	0,2446	0,1733	QUAs
0,2253	0,2204	0,0025	0,2898	0,1513	HQUAs
0,4659	0,4307	0,0646	0,2667	0,2760	QUAp
1,0000	0,6977	0,0510	0,3083	0,1865	QUAl1
	1,0000	0,0354	0,3915	0,2236	QUAl
		1,0000	0,0737	-0,0949	QUAm
			1,0000	0,3771	SATl
				1,0000	LOY

Annex 3 : Regressions results

Regression results P-value H1 & H3

Modèle 2: Estimation en Logit avec 854 observations 2-855
Variable dépendante: HSATs

VARIABLE	COEFFICIENT	ERR. STD	T	p. critique
const	8,16873	5,74785	1,421	0,15526
amazon	-0,962080	1,39284	-0,691	0,48973
zalando	-0,855357	2,05777	-0,416	0,67765
fnac	25,3113	286552	0,000	0,99993
aliexpress	21,1037	325893	0,000	0,99995
EXPb1	5,24232	2,06869	2,534	0,01127 **
EXPb2	28,4704	71092,8	0,000	0,99968
EXPb3	1,32988	2,58537	0,514	0,60698
EXPb4	1,10868	1,78361	0,622	0,53421
EXPb5	26,7465	87945,4	0,000	0,99976
EXPb6	5,12897	2,62546	1,954	0,05075 *
EXPb7	-0,487365	2,18240	-0,223	0,82329
EXPB8	1,05478	1,92304	0,548	0,58335
EXPc1	2,56145	2,13776	1,198	0,23084
EXPa	-2,07156	1,12025	-1,849	0,06443 *
EXPc2	-1,95842	1,58638	-1,235	0,21701
EXPc3	-5,15449	2,26137	-2,279	0,02264 **
EXPc4	2,47406	2,25892	1,095	0,27341
EXPc5	1,20082	3,29086	0,365	0,71519
EXPc6	-0,106317	3,51497	-0,030	0,97587
EXPc8	0,385918	1,79765	0,215	0,83002
EXPc9	-5,09007	2,47587	-2,056	0,03980 **
QUAw	1,13057	0,857140	1,319	0,18717
QUAw1	0,284539	0,820046	0,347	0,72861
QUAs	-0,706132	1,18187	-0,597	0,55019
QUAp	0,142980	0,835042	0,171	0,86405
QUAl1	0,708673	1,14960	0,616	0,53759
QUAl	-0,812316	1,11242	-0,730	0,46525
QUAm	-1,32013	1,36890	-0,964	0,33486

Moyenne de HSATs = 0,985
Nombre de cas 'correctement prédis' = 852 (99,8%)
f(beta'x) à la moyenne des variables indépendantes = 0,000
Pseudo-R2 de McFadden = 0,734167
Log de vraisemblance = -17,8919
Test du ratio de vraisemblance: Chi-deux(28) = 98,8267 (p. critique 0,000000)
Critère d'information d'Akaike (AIC) = 93,7839
Critère bayesien de Schwarz (BIC) = 231,532
Critère d'Hannan-Quinn (HQC) = 146,537

		Prédit 0	Prédit 1
Actuel	0	11	2
	1	0	841

Regression results Slopes H1 & H3.

VARIABLE	COEFFICIENT	EC. TYPE	T	PENTE (à la moyenne)
const	8,16873	5,74785	1,421	
amazon	-0,962080	1,39284	-0,691	0,000000
zalando	-0,855357	2,05777	-0,416	0,000000
fnac	25,3113	286552	0,000	7,63522E-013
aliexpress	21,1037	325893	0,000	6,36598E-013
EXPb1	5,24232	2,06869	2,534	1,58136E-013
EXPb2	28,4704	71092,8	0,000	8,58816E-013
EXPb3	1,32988	2,58537	0,514	0,000000
EXPb4	1,10868	1,78361	0,622	0,000000
EXPb5	26,7465	87945,4	0,000	8,06815E-013
EXPb6	5,12897	2,62546	1,954	1,54717E-013
EXPb7	-0,487365	2,18240	-0,223	0,000000
EXPB8	1,05478	1,92304	0,548	0,000000
EXPc1	2,56145	2,13776	1,198	0,000000
EXPa	-2,07156	1,12025	-1,849	0,000000
EXPc2	-1,95842	1,58638	-1,235	0,000000
EXPc3	-5,15449	2,26137	-2,279	-1,55487E-013
EXPc4	2,47406	2,25892	1,095	0,000000
EXPc5	1,20082	3,29086	0,365	0,000000
EXPc6	-0,106317	3,51497	-0,030	0,000000
EXPc8	0,385918	1,79765	0,215	0,000000
EXPc9	-5,09007	2,47587	-2,056	-1,53543E-013
QUAw	1,13057	0,857140	1,319	0,000000
QUAw1	0,284539	0,820046	0,347	0,000000
QUAs	-0,706132	1,18187	-0,597	0,000000
QUAp	0,142980	0,835042	0,171	0,000000
QUAl1	0,708673	1,14960	0,616	0,000000
QUAl	-0,812316	1,11242	-0,730	0,000000
QUAm	-1,32013	1,36890	-0,964	0,000000

Regression results P-value H1' & H3'

```
Modèle 4: Estimation en Logit avec 854 observations 2-855
Variable dépendante: SAT1

     VARIABLE        COEFFICIENT        ERR. STD          T          p. critique
  const                -3,92994          0,985900      -3,986    0,00007 ***
  amazon               -0,304246         0,509390      -0,597    0,55032
  zalando              22,3471        65733,5           0,000    0,99973
  fnac                 -0,470151         0,859993      -0,547    0,58459
  aliexpress           -0,287514         0,688682      -0,417    0,67632
  EXPa                  0,309014         0,251189       1,230    0,21862
  EXPb3                -0,0622282        0,372455      -0,167    0,86731
  EXPb4                -0,0145184        0,376005      -0,039    0,96920
  EXPb7                -0,760831         0,382989      -1,987    0,04697 **
  EXPc2                -0,149727         0,608960      -0,246    0,80578
  EXPc8                 0,491648         0,452460       1,087    0,27721
  EXPc9                -0,530391         0,467692      -1,134    0,25677
  QUAl1                 0,364556         0,228811       1,593    0,11110
  QUAl                  1,47286          0,256788       5,736   <0,00001 ***

  Moyenne de SAT1 = 0,946
  Nombre de cas 'correctement prédis' = 817 (95,7%)
  f(beta'x) à la moyenne des variables indépendantes = 0,003
  Pseudo-R2 de McFadden = 0,344528
  Log de vraisemblance = -117,407
  Test du ratio de vraisemblance: Chi-deux(13) = 123,422 (p. critique 0,000000)
  Critère d'information d'Akaike (AIC) = 262,813
  Critère bayesien de Schwarz (BIC) = 329,312
  Critère d'Hannan-Quinn (HQC) = 288,28

           Prédit
              0     1
  Actuel 0   15    31
         1    6   802
```

Regression results Slopes H1' & H3'.

```
Modèle 5: Estimation en Logit avec 854 observations 2-855
Variable dépendante: SAT1

     VARIABLE        COEFFICIENT        EC. TYPE          T              PENTE
                                                                  (à la moyenne)
  const                -3,92994          0,985900      -3,986
  amazon               -0,304246         0,509390      -0,597     -0,000962770
  zalando              22,3471        65733,5           0,000      0,0707162
  fnac                 -0,470151         0,859993      -0,547     -0,00148777
  aliexpress           -0,287514         0,688682      -0,417     -0,000909822
  EXPa                  0,309014         0,251189       1,230      0,000977857
  EXPb3                -0,0622282        0,372455      -0,167     -0,000196918
  EXPb4                -0,0145184        0,376005      -0,039     -4,59427E-05
  EXPb7                -0,760831         0,382989      -1,987     -0,00240761
  EXPc2                -0,149727         0,608960      -0,246     -0,000473803
  EXPc8                 0,491648         0,452460       1,087      0,00155579
  EXPc9                -0,530391         0,467692      -1,134     -0,00167839
  QUAl1                 0,364556         0,228811       1,593      0,00115362
  QUAl                  1,47286          0,256788       5,736      0,00466077
```

Regression results P-value H2

```
Modèle 10: Estimation en Logit avec 854 observations 2-855
Variable dépendante: HEXP

     VARIABLE        COEFFICIENT        ERR. STD          T          p. critique
  const                -0,262629         0,610136     -0,430    0,66687
  amazon                0,141066         0,185135      0,762    0,44608
  zalando               0,360121         0,305393      1,179    0,23832
  fnac                  0,143310         0,352306      0,407    0,68417
  aliexpress            0,224991         0,468565      0,480    0,63111
  QUAw                  0,0161729        0,121559      0,133    0,89416
  QUAwl                 0,104162         0,118941      0,876    0,38117
  QUAs                  0,370931         0,147601      2,513    0,01197 **
  QUAp                 -0,464891         0,118054     -3,938    0,00008 ***
  QUAll                 0,0908399        0,109634      0,829    0,40734
  QUAl                  0,00773659       0,111621      0,069    0,94474
  QUAm                  0,253164         0,160097      1,581    0,11381

  Moyenne de HEXP = 0,642
  Nombre de cas 'correctement prédis' = 553 (64,8%)
  f(beta'x) à la moyenne des variables indépendantes = 0,228
  Pseudo-R2 de McFadden = 0,0330121
  Log de vraisemblance = -538,791
  Test du ratio de vraisemblance: Chi-deux(11) = 36,7877 (p. critique 0,000125)
  Critère d'information d'Akaike (AIC) = 1101,58
  Critère bayesien de Schwarz (BIC) = 1158,58
  Critère d'Hannan-Quinn (HQC) = 1123,41

           Prédit
              0     1
  Actuel 0   39   267
         1   34   514
```

Regression results Slopes H2.

```
Modèle 11: Estimation en Logit avec 854 observations 2-855
Variable dépendante: HEXP

     VARIABLE        COEFFICIENT        EC. TYPE          T              PENTE
                                                                  (à la moyenne)
  const                -0,262629         0,610136     -0,430
  amazon                0,141066         0,185135      0,762       0,0321841
  zalando               0,360121         0,305393      1,179       0,0821617
  fnac                  0,143310         0,352306      0,407       0,0326963
  aliexpress            0,224991         0,468565      0,480       0,0513317
  QUAw                  0,0161729        0,121559      0,133       0,00368986
  QUAwl                 0,104162         0,118941      0,876       0,0237647
  QUAs                  0,370931         0,147601      2,513       0,0846280
  QUAp                 -0,464891         0,118054     -3,938      -0,106065
  QUAll                 0,0908399        0,109634      0,829       0,0207251
  QUAl                  0,00773659       0,111621      0,069       0,00176510
  QUAm                  0,253164         0,160097      1,581       0,0577593
```

Regression results P-value H2'.

```
Modèle 12: Estimation en Logit avec 854 observations 2-855
Variable dépendante: HEXP

     VARIABLE       COEFFICIENT        ERR. STD          T          p. critique
  const                0,215028         0,349988      0,614    0,53896
  amazon               0,138272         0,180942      0,764    0,44476
  zalando              0,455163         0,300044      1,517    0,12927
  fnac                 0,0695241        0,346495      0,201    0,84097
  aliexpress           0,364915         0,441153      0,827    0,40813
  QUAl1                0,0770901        0,102441      0,753    0,45173
  QUAl                -0,00507101       0,108200     -0,047    0,96262

  Moyenne de HEXP = 0,642
  Nombre de cas 'correctement prédis' = 548 (64,2%)
  f(beta'x) à la moyenne des variables indépendantes = 0,230
  Pseudo-R2 de McFadden = 0,00410259
  Log de vraisemblance = -554,899
  Test du ratio de vraisemblance: Chi-deux(6) = 4,5718 (p. critique 0,599781)
  Critère d'information d'Akaike (AIC) = 1123,8
  Critère bayesien de Schwarz (BIC) = 1157,05
  Critère d'Hannan-Quinn (HQC) = 1136,53

           Prédit
              0     1
  Actuel 0    0   306
         1    0   548
```

Regression results Slopes H2'.

```
Modèle 13: Estimation en Logit avec 854 observations 2-855
Variable dépendante: HEXP

     VARIABLE       COEFFICIENT        EC. TYPE          T              PENTE
                                                                  (à la moyenne)
  const                0,215028         0,349988      0,614
  amazon               0,138272         0,180942      0,764      0,0317586
  zalando              0,455163         0,300044      1,517      0,104543
  fnac                 0,0695241        0,346495      0,201      0,0159685
  aliexpress           0,364915         0,441153      0,827      0,0838144
  QUAl1                0,0770901        0,102441      0,753      0,0177062
  QUAl                -0,00507101       0,108200     -0,047     -0,00116472
```

Regression results P-value H4 & H5

```
Modèle 14: Estimation en Logit avec 854 observations 2-855
Variable dépendante: LOY

     VARIABLE        COEFFICIENT        ERR. STD          T          p. critique
  const                 2,47828          1,77501       1,396    0,16265
  amazon               -0,818652         0,593515     -1,379    0,16779
  zalando              -1,11582          0,862313     -1,294    0,19567
  fnac                 -0,454579         1,20881      -0,376    0,70688
  aliexpress           -1,08249          0,932003     -1,161    0,24545
  SATs                 -0,752583         0,352594     -2,134    0,03281 **
  QUAw                  0,824445         0,392395      2,101    0,03564 **
  QUAwl                -0,382071         0,340716     -1,121    0,26213
  QUAs                 -0,0793562        0,456971     -0,174    0,86213
  QUAp                  1,12851          0,292239      3,862    0,00011 ***
  QUAll                -0,198747         0,318129     -0,625    0,53214
  QUAl                  0,423461         0,306813      1,380    0,16753
  QUAm                 -2,14111          0,466022     -4,594   <0,00001 ***
  SATl                  2,89128          0,616158      4,692   <0,00001 ***

  Moyenne de LOY = 0,965
  Nombre de cas 'correctement prédis' = 827 (96,8%)
  f(beta'x) à la moyenne des variables indépendantes = 0,007
  Pseudo-R2 de McFadden = 0,409402
  Log de vraisemblance = -76,7357
  Test du ratio de vraisemblance: Chi-deux(13) = 106,386 (p. critique 0,000000)
  Critère d'information d'Akaike (AIC) = 181,471
  Critère bayesien de Schwarz (BIC) = 247,97
  Critère d'Hannan-Quinn (HQC) = 206,938

           Prédit
              0     1
  Actuel 0    8    22
         1    5   819
```

Regression results Slopes H4 & H5.

```
Modèle 16: Estimation en Logit avec 854 observations 2-855
Variable dépendante: LOY

     VARIABLE        COEFFICIENT        EC. TYPE          T              PENTE
                                                                   (à la moyenne)
  const                 2,47828          1,77501       1,396
  amazon               -0,818652         0,593515     -1,379     -0,00594965
  zalando              -1,11582          0,862313     -1,294     -0,00810934
  fnac                 -0,454579         1,20881      -0,376     -0,00330371
  aliexpress           -1,08249          0,932003     -1,161     -0,00786709
  SATs                 -0,752583         0,352594     -2,134     -0,00546949
  QUAw                  0,824445         0,392395      2,101      0,00599175
  QUAwl                -0,382071         0,340716     -1,121     -0,00277674
  QUAs                 -0,0793562        0,456971     -0,174     -0,000576730
  QUAp                  1,12851          0,292239      3,862      0,00820160
  QUAll                -0,198747         0,318129     -0,625     -0,00144442
  QUAl                  0,423461         0,306813      1,380      0,00307755
  QUAm                 -2,14111          0,466022     -4,594     -0,0155607
  SATl                  2,89128          0,616158      4,692      0,0210127
```

Regression results P-value H4' & H5'

```
Modèle 17: Estimation en Logit avec 854 observations 2-855
Variable dépendante: LOY

     VARIABLE       COEFFICIENT        ERR. STD          T           p. critique
  const                -0,700273         0,736546     -0,951    0,34173
  amazon               -0,460372         0,534882     -0,861    0,38940
  zalando              -1,01924          0,806587     -1,264    0,20636
  fnac                  0,171147         1,15951       0,148    0,88266
  aliexpress           -0,574006         0,749685     -0,766    0,44388
  QUAl1                 0,264574         0,250568      1,056    0,29101
  QUAl                  0,332959         0,266986      1,247    0,21236
  SATl                  2,49098          0,522099      4,771   <0,00001 ***

  Moyenne de LOY = 0,965
  Nombre de cas 'correctement prédis' = 822 (96,3%)
  f(beta'x) à la moyenne des variables indépendantes = 0,019
  Pseudo-R2 de McFadden = 0,235128
  Log de vraisemblance = -99,3788
  Test du ratio de vraisemblance: Chi-deux(7) = 61,0999 (p. critique 0,000000)
  Critère d'information d'Akaike (AIC) = 214,758
  Critère bayesien de Schwarz (BIC) = 252,757
  Critère d'Hannan-Quinn (HQC) = 229,31

           Prédit
              0     1
  Actuel 0    3    27
         1    5   819
```

Regression results Slopes H4' & H5'.

```
Modèle 18: Estimation en Logit avec 854 observations 2-855
Variable dépendante: LOY

     VARIABLE       COEFFICIENT        EC. TYPE          T              PENTE
                                                                  (à la moyenne)
  const                -0,700273         0,736546     -0,951
  amazon               -0,460372         0,534882     -0,861     -0,00862183
  zalando              -1,01924          0,806587     -1,264     -0,0190882
  fnac                  0,171147         1,15951       0,148      0,00320524
  aliexpress           -0,574006         0,749685     -0,766     -0,0107500
  QUAl1                 0,264574         0,250568      1,056      0,00495492
  QUAl                  0,332959         0,266986      1,247      0,00623564
  SATl                  2,49098          0,522099      4,771      0,0466509
```

Regression results P-value H6

VARIABLE	COEFFICIENT	ERR. STD	T	p. critique
const	-10,5481	2,18323	-4,831	<0,00001 ***
amazon	1,92031	1,09281	1,757	0,07888 *
zalando	-1,21259	1,15874	-1,046	0,29534
fnac	0,696316	1,23446	0,564	0,57271
aliexpress	1,41167	1,13814	1,240	0,21485
QUAw	2,17734	0,479119	4,544	<0,00001 ***
QUAwl	1,16007	0,341259	3,399	0,00068 ***
QUAp	0,0556599	0,295650	0,188	0,85067
QUAll	0,103142	0,339588	0,304	0,76134
QUAl	0,769599	0,367980	2,091	0,03649 **
QUAm	0,173768	0,459371	0,378	0,70523

Moyenne de HQUAs = 0,970
Nombre de cas 'correctement prédis' = 835 (97,8%)
f(beta'x) à la moyenne des variables indépendantes = 0,001
Pseudo-R2 de McFadden = 0,532399
Log de vraisemblance = -54,4231
Test du ratio de vraisemblance: Chi-deux(10) = 123,929 (p. critique 0,000000)
Critère d'information d'Akaike (AIC) = 130,846
Critère bayesien de Schwarz (BIC) = 183,095
Critère d'Hannan-Quinn (HQC) = 150,856

		Prédit 0	Prédit 1
Actuel	0	8	18
	1	1	827

Regression results Slopes H6.

Modèle 24: Estimation en Logit avec 854 observations 2-855
Variable dépendante: LOY

VARIABLE	COEFFICIENT	EC. TYPE	T	PENTE (à la moyenne)
const	-0,295315	1,27151	-0,232	
amazon	-0,533242	0,555334	-0,960	-0,00562686
zalando	-0,650251	0,852098	-0,763	-0,00686155
fnac	-0,607079	1,09173	-0,556	-0,00640599
aliexpress	-1,24953	0,801296	-1,559	-0,0131852
QUAw	0,676832	0,318254	2,127	0,00714205
QUAwl	-0,367973	0,300881	-1,223	-0,00388291
QUAp	0,961638	0,261255	3,681	0,0101474
QUAll	-0,0319316	0,273255	-0,117	-0,000336947
QUAl	0,745290	0,287622	2,591	0,00786442
QUAm	-1,68717	0,408731	-4,128	-0,0178033

Regression results P-value and slopes of the global Loyalty model.

VARIABLE	COEFFICIENT	ERR. STD	T	p. critique	
const	1,51193	2,51143	0,602	0,54716	
amazon	-1,43040	0,690906	-2,070	0,03842	**
zalando	-0,540722	1,00559	-0,538	0,59077	
fnac	-0,586004	1,29717	-0,452	0,65145	
aliexpress	-1,58075	1,01551	-1,557	0,11956	
EXPa	0,282576	0,661980	0,427	0,66948	
HEXPb	-0,403863	1,03997	-0,388	0,69776	
EXPb1	0,536729	0,646997	0,830	0,40678	
EXPb2	-1,34209	0,633806	-2,118	0,03422	**
EXPb3	0,327593	0,570839	0,574	0,56605	
EXPb4	0,855194	0,669746	1,277	0,20164	
EXPb5	-0,725745	0,593638	-1,223	0,22150	
EXPb6	0,459665	0,630242	0,729	0,46579	
EXPb7	-0,876146	0,594290	-1,474	0,14041	
EXPB8	0,847670	0,653302	1,298	0,19445	
EXPc1	0,914401	0,594990	1,537	0,12433	
EXPc2	-1,69721	0,861079	-1,971	0,04872	**
EXPc3	0,0412659	0,606829	0,068	0,94578	
EXPc4	-0,147636	0,630107	-0,234	0,81475	
EXPc5	-0,00975658	0,899265	-0,011	0,99134	
EXPc6	0,913279	1,06092	0,861	0,38933	
EXPc8	-0,316226	0,658717	-0,480	0,63118	
EXPc9	-0,160260	0,700546	-0,229	0,81905	
SATs	-0,969328	0,483235	-2,006	0,04487	**
QUAw	0,675015	0,427449	1,579	0,11430	
QUAwl	-0,267507	0,403909	-0,662	0,50778	
QUAs	-0,0502860	0,541927	-0,093	0,92607	
QUAp	1,43692	0,356938	4,026	0,00006	***
QUAll	-0,233240	0,334416	-0,697	0,48552	
QUAl	0,616808	0,347868	1,773	0,07621	*
QUAm	-2,47458	0,560009	-4,419	<0,00001	***
SATl	3,06139	0,716671	4,272	0,00002	***

Moyenne de LOY = 0,965
Nombre de cas 'correctement prédis' = 831 (97,3%)
f(beta'x) à la moyenne des variables indépendantes = 0,003
Pseudo-R2 de McFadden = 0,482399
Log de vraisemblance = -67,2513
Test du ratio de vraisemblance: Chi-deux(31) = 125,355 (p. critique 0,000000)
Critère d'information d'Akaike (AIC) = 198,503
Critère bayesien de Schwarz (BIC) = 350,5
Critère d'Hannan-Quinn (HQC) = 256,713

		Prédit 0	Prédit 1
Actuel	0	12	18
	1	5	819

VARIABLE	COEFFICIENT	EC. TYPE	T	PENTE (à la moyenne)
const	1,51193	2,51143	0,602	
amazon	-1,43040	0,690906	-2,070	-0,00483881
zalando	-0,540722	1,00559	-0,538	-0,00182917
fnac	-0,586004	1,29717	-0,452	-0,00198235
aliexpress	-1,58075	1,01551	-1,557	-0,00534740
EXPa	0,282576	0,661980	0,427	0,000955906
HEXPb	-0,403863	1,03997	-0,388	-0,00136620
EXPb1	0,536729	0,646997	0,830	0,00181566
EXPb2	-1,34209	0,633806	-2,118	-0,00454006
EXPb3	0,327593	0,570839	0,574	0,00110819
EXPb4	0,855194	0,669746	1,277	0,00289297
EXPb5	-0,725745	0,593638	-1,223	-0,00245507
EXPb6	0,459665	0,630242	0,729	0,00155497
EXPb7	-0,876146	0,594290	-1,474	-0,00296385
EXPB8	0,847670	0,653302	1,298	0,00286752
EXPc1	0,914401	0,594990	1,537	0,00309326
EXPc2	-1,69721	0,861079	-1,971	-0,00574138
EXPc3	0,0412659	0,606829	0,068	0,000139595
EXPc4	-0,147636	0,630107	-0,234	-0,000499426
EXPc5	-0,00975658	0,899265	-0,011	-3,30048E-05
EXPc6	0,913279	1,06092	0,861	0,00308947
EXPc8	-0,316226	0,658717	-0,480	-0,00106974
EXPc9	-0,160260	0,700546	-0,229	-0,000542130
SATs	-0,969328	0,483235	-2,006	-0,00327907
QUAw	0,675015	0,427449	1,579	0,00228346
QUAwl	-0,267507	0,403909	-0,662	-0,000904930
QUAs	-0,0502860	0,541927	-0,093	-0,000170109
QUAp	1,43692	0,356938	4,026	0,00486084
QUAll	-0,233240	0,334416	-0,697	-0,000789011
QUAl	0,616808	0,347868	1,773	0,00208655
QUAm	-2,47458	0,560009	-4,419	-0,00837107
SATl	3,06139	0,716671	4,272	0,0103561

Global loyalty model including the socio-demographics variables.

VARIABLE	COEFFICIENT	ERR. STD	T	p. critique	
const	-0,290330	3,64812	-0,080	0,93657	
amazon	-1,38211	0,741746	-1,863	0,06242	*
zalando	-0,602700	1,04500	-0,577	0,56411	
fnac	-1,43191	1,33007	-1,077	0,28167	
aliexpress	-2,04667	1,18832	-1,722	0,08501	*
EXPa	0,547436	0,467804	1,170	0,24191	
EXPb1	-0,263476	0,736444	-0,358	0,72052	
EXPb2	-1,49648	0,706505	-2,118	0,03416	**
EXPb3	0,283170	0,626387	0,452	0,65122	
EXPb4	1,31471	0,775007	1,696	0,08981	*
EXPb5	-0,809517	0,668766	-1,210	0,22610	
EXPb6	0,296039	0,688859	0,430	0,66737	
EXPb7	-1,20021	0,657454	-1,826	0,06792	*
EXPB8	1,17470	0,754127	1,558	0,11931	
EXPc1	0,928902	0,667951	1,391	0,16432	
EXPc2	-1,98974	0,985466	-2,019	0,04348	**
EXPc3	-0,129845	0,702363	-0,185	0,85333	
EXPc4	-0,307903	0,718432	-0,429	0,66823	
EXPc5	0,293707	1,07018	0,274	0,78374	
EXPc6	1,49513	1,35341	1,105	0,26928	
EXPc8	-0,783059	0,738134	-1,061	0,28875	
EXPc9	0,357396	0,803082	0,445	0,65630	
HSATs	1,03631	2,53141	0,409	0,68226	
QUAw	0,612009	0,477689	1,281	0,20013	
QUAw1	-0,241988	0,495295	-0,489	0,62514	
QUAs	0,319094	0,586142	0,544	0,58617	
QUAp	1,52437	0,378938	4,023	0,00006	***
QUAl1	-0,436964	0,394950	-1,106	0,26856	
QUAl	0,527437	0,361778	1,458	0,14487	
QUAm	-3,14470	0,664423	-4,733	<0,00001	***
SAT1	4,20854	0,930758	4,522	<0,00001	***
SATs	-0,593996	0,528211	-1,125	0,26078	
age	0,00401227	0,0224192	0,179	0,85796	
gender	-1,98182	0,663023	-2,989	0,00280	***
income	1,05826	0,363401	2,912	0,00359	***
SPE	-0,869304	0,440183	-1,975	0,04828	**

Moyenne de LOY = 0,965
Nombre de cas 'correctement prédis' = 837 (98,0%)
f(beta'x) à la moyenne des variables indépendantes = 0,001
Pseudo-R2 de McFadden = 0,552945
Log de vraisemblance = -58,0853
Test du ratio de vraisemblance: Chi-deux(35) = 143,687 (p. critique 0,000000)
Critère d'information d'Akaike (AIC) = 188,171
Critère bayesien de Schwarz (BIC) = 359,168
Critère d'Hannan-Quinn (HQC) = 253,657

		Prédit	
		0	1
Actuel	0	16	14
	1	3	821